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1.0 PROJECT OBJECTIVES

The project objective is to design and construct facilities for the military that are consistent with the design and construction practices used for civilian sector projects that perform similar functions to the military projects. For example, a Company Operations Facility has the similar function as an office/warehouse in the civilian sector; therefore the design and construction practices for a company operations facility should be consistent with the design and construction of an office/warehouse building.

Comparison of Military Facilities to Civilian Facilities

Military Facility	Civilian Facility
Barracks/Company Operations Facility (B/COF)	Dormitory / Office Building
Lawn Equipment Building (LEB)	Storage Shed

It is the Army's objective that these buildings will have a 25-year useful design life before a possible re-use/re-purpose or renovation requirement, to include normal sustainment, restoration, modernization activities and a 50-year building replacement life. Therefore, the design and construction should provide an appropriate level of quality to ensure the continued use of the facility over that time period with the application of reasonable preventive maintenance and repairs that would be industry-acceptable to a major civilian sector project OWNER. The site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles.

The project site should be developed for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

Requirements stated in this contract are minimums. Innovative, creative, and life cycle cost effective solutions, which meet or exceed these requirements are encouraged. Further, the OFFEROR is encouraged to seek solutions that will expedite construction (panelization, pre-engineered, etc.) and shorten the schedule. **The intent of the Government is to emphasize the placement of funds into functional/operational requirements. Materials and methods should reflect this by choosing the lowest Type of Construction allowed by code for this occupancy/project allowing the funding to be reflected in the quality of interior/exterior finishes and systems selected.**

1.1. SECTION ORGANIZATION

This Section is organized under 6 major "paragraphs".

- (1) Paragraph 1 is intended to define the project objectives and to provide a comparison between the military facility(ies) and comparable "civilian" type buildings.
- (2) Paragraph 2 describes the scope of the project.
- (3) Paragraph 3 provides the functional, operational and facility specific design criteria for the specific facility type(s) included in this contract or task order.
- (4) Paragraph 4 lists applicable industry and government design criteria, generally applicable to all facility types, unless otherwise indicated in the Section. It is not intended to be all-inclusive. Other industry and government standards may also be used, where necessary to produce professional designs, unless they conflict with those listed.
- (5) Paragraph 5 contains Army Standard Design Criteria, generally applicable to all facility types, unless otherwise indicated in the Section.
- (6) Paragraph 6 contains installation and project specific criteria supplementing the other 5 paragraphs.

2.0 SCOPE

2.1. BASIC TRAINING AND ONE STATION UNIT TRAINING (BT/OSUT) COMPLEX

2.1.1. BARRACKS/COMPANY OPERATIONS FACILITY

Provide 3 standard B/COFs. This facility type is to house single trainee soldiers and company administrative, training and command operations.

Maximum number of single personnel to be housed is 240 per B/COF. Each B/COF is designed for a surge capacity of 288 single personnel.

The maximum gross area for each B/COF is 64,700 square feet.

The floor plans provided in Attachment A - Drawings indicate functional and operational arrangements that meet user operability requirements. The floor plans provided in Attachment A (located at the end of paragraph 3) are mandatory and indicate functional and operational arrangements that meet user operability requirements. The Design/Build (D/B) Contractor is required to adhere to these mandatory designs. Minor plan alterations are permitted to accommodate building system requirements, however, the Minimum Area Requirements shall not be reduced in order to accommodate building system requirements.

2.1.2. NOT USED

2.1.3. NOT USED

2.1.4. LAWN EQUIPMENT BUILDING

Provide one Lawn Equipment Building (LEB). This facility type is to store lawn maintenance equipment. There is no provision for fuel storage in this building.

The allocated gross area for lawn equipment storage is 400 square feet per B/COF. The maximum gross area for the LEB is 2,000 square feet.

2.2. SITE:

Provide all site improvements necessary to support the new building facilities. Refer to Paragraph 6.

Include Antiterrorism/Force Protection measures in the facility design in accordance with applicable criteria. The Contractor shall be responsible for all repairs to existing sidewalks, pavements, curb and gutter, utilities, and/or landscaping damaged as a result of his construction activities.

Approximate area available 31.80 acres in the limits of construction, as shown on the site layout plan. Refer to Appendix J - Drawings.

2.3. GOVERNMENT-FURNISHED GOVERNMENT-INSTALLED EQUIPMENT (GFGI)

Coordinate with Government on GFGI item requirements and provide suitable structural support, brackets for projectors/VCRs/TVs, all utility connections and space with required clearances for all GFGI items. Fire extinguishers are GF/GI personal property, while fire extinguisher brackets and cabinets are Contractor furnished and installed CF/CI. Include tables/cabinets/carts/etc. for GFGI equipment that is not freestanding in furniture design. All Computers and related hardware, copiers, faxes, printers, video projectors, VCRs and TVs are GFGI.

The following are also GFGI items: Additional GFGI equipment and furnishing are specified herein in Section 01 10 00.

- Clothes Washers
- Stackable Clothes Dryers
- All exercise Equipment
- Dumpsters

2.4. FURNITURE REQUIREMENTS

Provide furniture design for all spaces listed in Chapter 3 and including any existing furniture and equipment to be re-used. Coordinate with the user to define requirements for furniture systems, movable furniture, storage systems, equipment, any existing items to be reused, etc. Early coordination of furniture design is required for a complete and usable facility.

The procurement and installation of furniture is NOT included in this contract. Furniture will be provided and installed under a separate furniture vendor/installer contract. The general contractor shall accommodate that effort with allowance for entry of the furniture vendor/installer onto this project site at the appropriate time to permit completion of the furniture installation for a complete and usable facility to coincide with the Beneficial Occupancy Date (BOD) of this project. The furniture vendor/installer contract will include all electrical pre-wiring and the whips for final connection to the building electrical systems however; the general contractor shall make the final connections to the building electrical systems under this contract. Furthermore, the general contractor shall provide all Information/Technology (IT) wiring (i.e. LAN, phone, etc.) up to and including the face plate of all freestanding and/or systems furniture desk tops as applicable, the services to install the cable and face plates in the furniture, the coordination with the furniture vendor/installer to accomplish the installation at the appropriate time, and all the final IT connections to the building systems under this contract.

The Government reserves the right to change the method for procurement of and installation of furniture to Contractor Furnished/Contractor Installed (CF/CI). CF/CI furniture will require competitive open market procurement by the Contractor using the Furniture, Fixtures and Equipment (FF&E) package.

2.5. NOT USED

3.0 BASIC TRAINING (BT) AND ONE STATION UNIT TRAINING (OSUT) COMPLEX

3.1 GENERAL

BT complexes are required by the Army to encompass living, dining, training, and administrative/command operations. A BT Complex consists of Barracks/Company Operations Facilities (B/COF), Dining Facility (DFAC), Battalion Headquarters (BNHQ), and a Lawn Equipment Building (LEB). In addition, a Central Cooling Plant (CCP) may be part of the complex. These facilities, with outdoor training areas and any additional support structures and amenities, shall be arranged on the site as a unit to allow the Battalion to live, eat, train and work together. This project consists of the facilities listed and described below.

A B/COF is comprised of sleeping bays, restrooms, classrooms, storage, laundry areas, scrub rooms and company operations components.

A LEB is a storage building for lawn maintenance equipment

3.2 FUNCTIONAL AND AREA REQUIREMENTS

Gross building area shall be calculated in accordance with Appendix Q. Net area is measured to the inside face of the room or space walls. Minimum dimension where stated shall be measured to the inside face of the defining enclosure. Net area requirements for programmed spaces are included in this paragraph. If net area requirements are not specified, the space shall be sized to accommodate the required function and to comply with code requirements, overall gross area limitations, and any other requirement of this RFP. Area requirements for corridors, stairs, and mechanical rooms will typically be left to the discretion of the offeror.

3.2.1 ACCESSIBILITY

The B/COF and LEB facilities are intended for occupancy and/or use by able-bodied military personnel only. In accordance with paragraph 3 (a) of the Deputy Secretary of Defense Memorandum dated 31 October 2008: DoD Access for People with Disabilities, facilities for able-bodied personnel are exempt from accessibility requirements. Headquarters buildings shall comply with the Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities as currently amended. In accordance with ADA Section 203.5 and ABA Section F203.6, the CCP is exempt from accessibility requirements.

3.2.2 B/COF

3.2.2.1 Functional Space Requirements - First Floor

- (a) Vestibule: Provide an enclosed transition space between the exterior and interior of the building, at the primary entry point.
- (b) Stair Vestibule: Stair vestibule shall be the secondary ground floor entry into the sleeping bays and shall be located at the fire exit stairwell located with the back end of the covered training area.
- (c) Reception/CQ: Provide a reception area in the company operations area.
- (d) Offices: Provide private offices for the Company Commander (CO), Executive Officer (XO), 1st Sergeant (1st SGT) and Training Office (TRO).
- (e) Men's Toilet/Shower: Provide one shower stall and toilet facilities to serve the administrative personnel assigned to company. Provide a dressing area with a built-in wooden bench adjacent to the shower area. Length of bench shall be full width of shower minus 6 inches.
- (f) Women's Toilet/Shower: Provide one shower stall and toilet facilities to serve the administrative personnel assigned to company. Provide a dressing area with a built-in wooden bench adjacent to the shower area. Length of bench shall be full width of shower minus 6 inches.
- (g) Janitor: Provide a janitor's closet. Janitor's closet shall have a 10 inch deep floor mounted stainless steel mop sink, with hot and cold service faucet, a four holder mop rack and two 18 inch deep by 48 inch long heavy duty stainless steel shelves for storage of cleaning supplies. Janitor's closet shall have space for storage of buckets and vacuum.

- (h) Luggage Storage: Provide one lockable central luggage storage area partitioned into four separate and equal storage rooms. Each storage room shall be accessible from the central core of the central luggage storage area and shall have a lockable door.
- (i) Supply: Provide storage space for company supplies and equipment, weapons, and consumable supplies. Shipping and receiving functions are performed from company supply area. Provide a 7 feet high by 8 feet wide, overhead coiling door with ramp for exterior vehicular access. A built-in issue counter with a laminated sliding glass window shall be integrated with a lockable rolling shutter door between this room and the queuing corridor. Issue counter opening shall be 36 inches wide and 42 inches high minimum. Provide space in the supply room area for two Supply NCOs.
- (j) Secure Storage: Provide a secure storage area for high value items of electronic equipment, e.g. night goggles. Secure storage area shall be adjacent to the arms vault and shall be accessible from the company supply area only. Secure storage shall have 18 inch deep built-in storage shelves, spaced at 18 inches on center vertically and capable of supporting a minimum of 20 pounds per linear foot. Total linear footage of storage shelves shall be three times the perimeter of the storage room.
- (k) Mask Storage: Provide a mask storage room adjacent to the arms vault. Mask storage room shall have a lockable dutch-door with a supply shelf built into the bottom leaf. Mask storage room shall be accessible from the queuing corridor only. Mask storage room shall have 12 inch deep built-in storage shelves, spaced at 15 inches on center vertically and capable of supporting a minimum of 20 pounds per linear foot. Total linear footage of storage shelves shall be along the long wall of the storage room.
- (l) Arms Vault: Arms vault for storage of arms shall comply with Appendix G of AR 190-11, Physical Security of Arms, Ammunition, and Explosives. Arms vault door shall incorporate a steel dutch-door type day-gate with a steel issue shelf built into the lower leaf of the day-gate. Arms vault shall be adjacent to the company supply storage room and shall be accessible from the queuing corridor only.
- (m) Stairs: Provide 4 feet 6 inch minimum width stairs.
- (n) Corridors: Provide 6 feet minimum width corridors. Corridor in front of the administrative offices shall be 10 feet minimum width, to serve as a waiting area.
- (o) Queuing Corridor: Provide a queuing corridor minimum 6 feet wide, connecting the mask storage room, the arms vault and the company supply room.
- (p) Multipurpose Room: Provide two multipurpose rooms for fitness training and other purposes as determined by the battalion. Locate one multipurpose room at the rear end of each covered training area beneath the bathroom wings of the upper floors. Each multipurpose room shall have 48 inches high dry-eraser marker boards along entire length of front and side walls and one power operated 8'-0" x 6'-0" ceiling flush mounted projection screen at front of the room. Projection screen shall be flame retardant, mildew resistant, and white matte with black masking borders. Furnish and install a low profile ceiling mounted projector mount system with each projection screen. Ceiling mount shall consist of a steel ball joint and universal projector bracket. Ceiling mount shall project a maximum 6 inches below finished ceiling height, and shall securely attach to ceiling and structure above. Steel ball joint shall attach to the universal projector bracket with twist-lock engagement. Mount shall provide up to 30° roll or pitch adjustment and 360° yaw adjustment at ball joint. Two setscrews lock ball joint in position. Projector mount shall be capable of supporting a 26 pound load. Furnish and install concealed electrical wiring, connections and accessories necessary for projector operation.
- (q) Scrub Room: Provide two scrub rooms for equipment and weapons cleaning. Locate one scrub room at the rear end of each covered training area beneath the bathroom wings of the upper floors across from the multipurpose rooms. Each scrub room shall be furnished with a fixed continuous heavy gauge (minimum 16 gauge, type 304 stainless steel), 4 inches deep, stainless steel wash trough, sub-divided into six wash positions, along one wall. Each wash position shall be 4 feet wide and 3 feet deep, shall be separately drained and shall be furnished with a 9 inches high goose-necked, cold/hot water faucet with paddle type handles. Each scrub room shall also be furnished with a fixed 12 feet by 6 feet, minimum heavy gauge, type 304 stainless steel), 4 inches deep, stainless steel wash trough, sub-divided into four wash positions centered in the room for equipment cleaning. Each wash position shall be 6 feet wide and 3 feet deep, shall be separately drained and shall be furnished with a 9 inch high goose-necked, cold/hot water faucet with paddle type handles. Each scrub room shall be furnished with a fixed 3 feet deep by length of wall, minimum 16 gauge, type 304 stainless steel counter top, running the full length of one long wall of the room for weapons cleaning.
- (r) Mechanical, Electrical, and Telecommunications Rooms: Mechanical rooms shall be sized to accommodate equipment maintenance and repair access without having to remove other equipment. Mechanical, electrical and

telecommunications rooms shall be keyed separately for access by Installation maintenance personnel. First floor exterior access is required for centralized mechanical. All telecommunications rooms shall be conditioned space. Refer to Mechanical, Electrical and Telecommunications Sections for additional information.

- (s) Covered Training Area: Provide two covered training areas located under the sleeping bays.
- (t) Boot Wash: Provide an outdoor area for soldiers to rinse mud from field gear, boots and clothing. Boot Wash station shall be provided at three (3) locations- each building wing and the main building entrance. Each boot wash station shall consist of two freeze-proof hydrants located adjacent to a grated drain assembly complete with sand interceptor. Provide two spray nozzles on 60 inch long flexible hoses per hydrant.

3.2.2.2 Functional Space Requirements - Second and Third Floor

- (a) Entry Vestibule: Entry vestibule for the sleeping bays shall be at the primary stairwell on each sleeping bay floor.
- (b) Stair Vestibule: Stair vestibule shall be the secondary entry into each sleeping bay and shall be located at the fire exit stairwell located with the bathroom and laundry at the rear of each sleeping bay.
- (c) Sleeping Bay: Each sleeping bay shall be designed to accommodate sixty trainees in a dormitory layout. Sleeping bays must be of equal size and able to accommodate one bunk 84 inches long by 42 inches wide and one wardrobe 42 inches wide x 24 inches deep for each trainee, with adequate circulation. Surge capacity requirements will be met by using double bunks. A minimum ceiling height of 9 feet is required. One sleeping bay in each B/COF shall be divided into two equal halves along the length of the bay, by a full height, insulated, gender separation wall. Gender separation wall finish shall be a minimum of one layer of 5/8 inch impact resistant gypsum wallboard on each side of wall framing. Wall assembly shall have a minimum rating of STC 50 and shall be one-hour fire rated. All furniture listed here are GFGI.
- (d) Toilet/Shower/Dressing: Each sleeping bay shall have two separate and equal toilet/showers/dressing rooms. Each toilet/shower/dressing room shall have a dressing area and shall be furnished with a minimum of ten shower stalls, six water closets and six lavatories. Urinals shall not be substituted for water closets. Dressing area shall be furnished with continuous hardwood benches and mirrors. Benches shall be mounted on powder-coated steel pedestals permanently anchored to the floor. Benches shall run the entire length of the two longest walls of the dressing area. Furnish and install four full length wall mirrors each 16 to 24 inches wide by 72 inches high, spaced evenly on one short wall of each dressing area. Furnish and install thirty wall mounted clothes hooks spaced evenly along the walls of each dressing area above the wood benches. Lavatories shall be provided in a continuous solid surface material vanity top. Each lavatory shall be furnished with a combination stainless steel framed mirror and stainless steel shelf. Mirror shall be minimum 18 inches wide by 24 inches high. Stainless steel shelf length shall be full width of mirror and minimum 5 inches deep. Extend ceramic tile shower surround to ceiling. Provide tamper resistant showerheads.
- (e) Laundry: Each sleeping bay shall have two separate and equal laundry rooms. Locate one laundry room adjacent to each toilet/shower/dressing area. Each laundry room door shall be 36 inches wide minimum. Each laundry room shall accommodate a total of five heavy-duty, extra capacity, commercial washers and six heavy-duty, extra capacity, double stacked commercial dryers. Washers and dryers are GFGI. Contractor furnished and installed fixed heavy gauge stainless steel clothes folding/hanging tables measuring 2 feet deep by 5 feet wide, and one stainless steel laundry tray and sink are required features of each laundry room. Provide power receptacles, natural gas connection (where gas is available to site) and vent connections for all dryers. Dryers shall be exhausted to the exterior. Do not manifold dryer exhaust vents.
- (f) Stair: Provide 4 feet 6 inch minimum width stairs.
- (g) Corridors: Provide 6 feet minimum width corridors. Corridors along the platoon classroom area shall be 8 feet minimum width.
- (h) Drill Instructor (DI) Office: Provide an administrative office adjacent to each sleeping bay on each floor. Each DI Office shall be designed to accommodate three work stations.
- (i) DI Toilet/Shower: Provide a toilet and shower adjacent to the DI Office and accessible from the DI Office only. Furnish and install two single tier metal lockers in each DI toilet/shower. Each locker shall be 18 inches wide by 18 inches deep by 78 inches high, and shall be lockable.
- (j) Platoon Classrooms: Provide a classroom adjacent to each sleeping bay on each floor. Each classroom shall be sized for 60-persons seating and space for an instructor. Each classroom shall have 48 inches high dry-eraser marker boards along entire length of front and side walls and two power operated 8'-0" x 6'-0" ceiling flush

mounted projection screens at front of the classroom. Projection screens shall be flame retardant, mildew resistant, and white matte with black masking borders. Furnish and install a low profile ceiling mounted projector mount system with each projection screen. Ceiling mount shall consist of a steel ball joint and universal projector bracket. Ceiling mount shall project a maximum 6 inches below finished ceiling height, and shall securely attach to ceiling and structure above. Steel ball joint shall attach to the universal projector bracket with twist-lock engagement. Mount shall provide up to 30° roll or pitch adjustment and 360° yaw adjustment at ball joint. Two setscrews lock ball joint in position. Projector mount shall be capable of supporting a 26 pound load. Furnish and install concealed electrical wiring, connections and accessories necessary for projector operation. Windows shall have operable blinds.

(k) Platoon Classroom Storage: Provide a shared storage room for the two classrooms on each floor. Storage room shall have 18 inch deep built-in storage shelves, spaced at 18 inches on center vertically and capable of supporting a minimum of 20 pounds per linear foot. Total linear footage of storage shelves shall be two times the perimeter of the storage room.

(l) TA-50 Storage: Provide a TA-50 storage room for each sleeping bay on each floor. Each TA-50 storage room shall have 24 inch deep built-in storage shelves, spaced at 24 inches on center vertically and capable of supporting a minimum of 30 pounds per linear foot. Total linear footage of storage shelves shall be three times the perimeter of the storage room.

(m) General Storage: Provide one general storage room for each sleeping bay, adjacent to the TA-50 storage.

(n) Janitor: Provide one janitor's closet on each floor, in the central core area. Janitor's closet shall have a 10 inch deep floor mounted stainless steel mop sink, with hot and cold service faucet, a four holder mop rack and two 18 inch deep by 48 inch long heavy duty stainless steel shelves for storage of cleaning supplies. Janitor's closet shall have space for storage of buckets and vacuum.

(o) Mechanical, Electrical, and Telecommunications Rooms: Mechanical rooms shall be sized to accommodate equipment maintenance and repair access without having to remove other equipment. Mechanical, electrical and telecommunications rooms shall be keyed separately for access by Installation maintenance personnel. First floor exterior access is required for centralized mechanical. All telecommunications rooms shall be conditioned space. Refer to Mechanical, Electrical Telecommunications Sections for additional information.

3.2.2.3 Space Allocation Table

B/COF MINIMUM SQUARE FOOTAGE REQUIREMENTS NET SQUARE FEET (NSF)			
	1st FLOOR	2nd FLOOR	3rd FLOOR
VESTIBULE	195	-	-
STAIR VESTIBULE	AS NEEDED	-	-
RECEPTION/CQ STATION	250	-	-
COMPANY COMMANDER (CO)	150	-	-
EXECUTIVE OFFICER (XO)	110	-	-
FIRST SARGEANT (1st SGT)	120	-	-
TRAINING OFFICE (TRO)	110	-	-
MEN'S TOILET/SHOWER	AS NEEDED	-	-
WOMEN'S TOILET/SHOWER	AS NEEDED	-	-
JANITOR	30	-	-
COMPANY SUPPLY	800	-	-
SECURE STORAGE	245	-	-
LUGGAGE STORAGE	360	-	-
MASK STORAGE	200	-	-
ARMS VAULT	380	-	-
SCRUB ROOM	480 x 2		

B/COF MINIMUM SQUARE FOOTAGE REQUIREMENTS NET SQUARE FEET (NSF)			
	1st FLOOR	2nd FLOOR	3rd FLOOR
MULTIPURPOSE ROOM	890 x 2	-	-
QUEUING CORRIDOR	AS NEEDED	-	-
STAIRS	AS NEEDED	-	-
CORRIDORS	AS NEEDED	-	-
COVERED TRAINING AREA	5,184 x 2		
MECHANICAL, ELECTRICAL AND TELECOMMUNICATIONS	AS NEEDED	-	-
STAIR VESTIBULE	-	AS NEEDED	AS NEEDED
ENTRY VESTIBULE	-	AS NEEDED	AS NEEDED
TOILET/ SHOWER/ DRESSING	-	AS NEEDED	AS NEEDED
JANITOR	-	30	30
LAUNDRY	-	AS NEEDED	AS NEEDED
SLEEPING BAY	-	5,184 x 2	5,184 x 2
DRILL INSTRUCTOR (DI) OFFICE	-	250 x 2	250 x 2
DI TOILET/SHOWER	-	84 x 2	84 x 2
TA-50 STORAGE	-	160 x 2	160 x 2
PLATOON CLASSROOMS	-	900 x 2	900 x 2
PLATOON CLASSROOM STORAGE	-	70	70
GENERAL STORAGE	-	120	120
CORRIDORS	-	min 6' wide	min 6' wide
TELECOMMUNICATIONS	-	100	100
MECHANICAL	-	AS NEEDED	AS NEEDED
ELECTRICAL	-	AS NEEDED	AS NEEDED

3.2.3 NOT USED

3.2.4 NOT USED

3.2.5 Lawn Equipment Building

Provide a lawn maintenance equipment storage building, based on 400 gross square feet per B/COF. LEB shall be divided with partitions, to provide an individually securable storage space with separate access for each B/COF. Access to each individual storage space shall be through a lockable overhead coiling door minimum eight feet wide by seven feet high.

3.3 SITE REQUIREMENTS

3.3.1 Walks: Provide pedestrian walks within the designated construction area and connect to existing sidewalks, where applicable.

3.3.1.1 Sidewalks shall be a minimum of 6 feet wide. Troop formation sidewalks shall be a minimum of 15 feet

wide. Troop formation sidewalks that are also designed to support emergency and service vehicle traffic shall be a minimum of 20 feet wide per NFPA requirements. Walks paralleling buildings shall be located beyond the eave drip line and at least 5 feet from the foundation.

3.3.1.2 Non-vehicular pedestrian and troop formation sidewalks shall be constructed of Portland Cement Concrete having a minimum nominal thickness of 4 inches. Joint patterns shall be designed in accordance with American Association of State Highway and Transportation Officials (AASHTO) standards and shall be uniform and symmetrical. The length to width ratio shall not exceed 1.25 for non-reinforced pavements.

3.3.1.3 Troop formation sidewalks designed to support emergency and service vehicle traffic will be considered roadway pavements and shall be designed to meet AASHTO standards. Vehicular supported walks shall be constructed of Portland Cement Concrete having a minimum nominal thickness of 7 inches. Joints shall be designed in accordance with AASHTO standards and shall be uniform and symmetrical. The length to width ratio shall not exceed 1.25 for non-reinforced pavements.

3.3.2 Physical Fitness Training Areas

Outdoor training areas, particularly those that are needed for physical fitness, should be located to the interior areas of the BT Complex. The minimum mandatory exterior training areas for the complex include one running track per Battalion, one physical training (PT) pit per B/COF and four 4-station climbing bar sets per B/COF.

3.3.2.1 Running Track: Provide one closed, oval or round shaped, 1/4 mile running track. The track must be a separate stand alone feature, not incorporated into other site features, such as roads or walks. The entire track must be observable from one central location to allow minimal drill instructor oversight. The track shall be constructed of a synthetic sports surface material, as specified in Specification Section 02 83 30 SYNTHETIC SPORTS SURFACE (located in Attachment A, at the end of Paragraph 3). Track width shall be 15 feet. Running lanes are not required. Surface and subsurface drainage shall be designed for the track. No standing water shall be allowed on the track. Track lighting level shall be a minimum of 3 foot-candles and shall be switch operated.

3.3.2.2 PT Pits: Provide one PT Pit and four 4-station climbing bar sets for each B/COF. Refer to Attachment A - Drawings for physical training equipment. Each pit shall be a minimum of 18,500 square feet. Square pits are desired, but pits configurations may be adjusted to accommodate site conditions. The pits shall be located to the rear of each facility and can either be stand alone facilities or located within the interior of the track. Separation of PT pits located within the track shall be visibly defined. PT pits will be used for hand to hand combat drills, as well as, calisthenics. The PT pit shall be constructed of a durable, low maintenance surface, such as shredded rubber chips. Surface and subsurface drainage shall be designed for the PT pits. No standing water shall be allowed on the PT pits. No canopy coverings may be provided over the PT pits, and no fences shall be provided around the pits. Pit lighting level shall be a minimum of 3 foot-candles and shall be switch operated.

3.3.3 Site Structures and Amenities

3.3.3.1 Dumpster Area: Dumpster enclosure area(s) and screening shall be located, designed and constructed by the Contractor. The Contractor is responsible for locating the dumpster areas in accordance with UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings.

3.3.3.2 The dumpster enclosure areas shall be located outside of restricted areas to allow for servicing activities. Dumpsters are GFGI. Dumpster pads shall be sized to accommodate both trash and recycling dumpsters. Dumpster screening shall be aesthetically and architecturally compatible with the building it serves and shall be designed in accordance with the Installations guidelines.

3.3.4 Site Functional Requirements

3.3.4.1 Privately Owned Vehicle (POV) Parking: POV parking, within the designated BT Complex construction area, shall be designed and constructed by the Contractor. The location of the POV parking area(s) shall be designed based on the Installation's site constraints. Parking can either be consolidated or spread out along the perimeter of the complex. The Contractor shall ensure that the location of parking complies with UFC 4-010-01. See paragraph 5.2.3 VEHICLE PAVEMENTS for additional information. POV parking shall be provided as follows:

- B/COF- 18 spaces per 240 man B/COF
- BNHQ- 23 spaces total which includes two accessible spaces and three visitor spaces

3.3.4.2 Service Drives: The Contractor shall provide service drives to each building. The drives shall be located in accordance with UFC 4-010-01. Where applicable, access to the drives shall be restricted as required by UFC 4-010-01. The pavement design shall be as required by paragraph 5.2.3 VEHICLE PAVEMENTS. Minimum access drive width shall be 24 feet. Drives shall be provided with curb and gutter. Minimum turning radius shall be designed as required for emergency vehicle access.

3.3.4.3 Troop Formation/Assembly Areas: Pavements for Troop formation/assembly areas, such as the pavement beneath the outdoor "Covered Assembly Areas" shall be constructed of Portland Cement Concrete having a minimum nominal thickness of 4 inches. Troop formation areas that are designed to also support emergency and service vehicle traffic will be designed as roadway pavements and designed to meet AASHTO standards. Vehicular supported walks shall be constructed of Portland Cement Concrete having a minimum nominal thickness of 7 inches. Joint patterns shall be designed in accordance with AASHTO standards and shall be uniform and symmetrical. The length to width ratio shall not exceed 1.25 for non-reinforced pavements.

3.3.4.4 Emergency Vehicle Access: Provide access in accordance with NFPA 1, UFC 3-600-01 and the Installation's requirements.

3.3.5 Building Relationship Hierarchy and Distances

BUILDING HIERARCHY	
Building Relationships	Maximum Distance
B/COF to DFAC	1680'
B/COF to PT Pits and Track	1200'
BNHQ to 1-story DFAC	1920'
BNHQ to 2-story DFAC	1800'
B/COF to BNHQ	1680'

3.4 ARCHITECTURAL REQUIREMENTS

3.4.1 Hardware

3.4.1.1 Fire Department Secure Lock-Box: Provide a secure lock box at the main entrance to the facility. Knox Box shall be Knox Box 3200 Series and provided with a hinged door, alarm tamper switch and a recessed mount kit. Knox-box ordering forms and information is available at the Installation Fire Department. Contact Gino Sita or per Hines for forms.

3.4.1.2 Finish Hardware: All hardware shall be consistent and shall conform to ANSI/BMHA standards for Grade 1. All requirements for hardware keying shall be coordinated with the Contracting Officer. Extension of the existing Installation's keying system shall be provided. The Installation keying system is Best Lock Corporation Locksets shall have interchangeable cores. Cores shall have no fewer than seven pins. Cores shall have not less than seven pins. Cylinders shall have key-removable type cores. Disassembly of knob or lockset shall not be required to remove core from lockset. Locksets for mechanical, electrical and telecommunications rooms only shall be keyed to the existing Installation Master Keying System. HVAC terminal units that are accessed from a central corridor shall have a deadbolt to minimize protrusion into corridor. Plastic cores are unacceptable. Provide closers for all exterior doors, all doors opening to corridors and as required by codes. Exit devices shall be installed on all building egress doors.

3.4.1.3 Auxiliary Hardware: Provide wall or floor stops for all exterior doors that do not have overhead holder/stops. Provide other hardware as necessary for a complete installation.

3.4.1.4 Hardware for Fire Doors: Hardware for fire doors shall be installed in accordance with the requirements of applicable codes. Exit devices installed on fire doors shall have a visible label bearing the marking "Fire Exit Hardware". Other hardware installed on fire doors, such as locksets, closers, and hinges shall have a visible label or stamp indicating that the hardware items have been approved by an approved testing agency for installation on fire-rated doors. Hardware for smoke-control door assemblies shall be installed in accordance with applicable codes.

3.4.2 Special Acoustical Requirements

3.4.2.1 Exterior walls and roof/floor/ceiling assemblies, doors, windows and interior partitions shall be designed to provide for attenuation of external noise sources such as airfields in accordance with applicable criteria. Provide sound insulation to meet a minimum rating of STC 49 at walls and floor/ceiling assemblies. At interior doors provide solid core wood doors in metal frame with sound insulation to meet a minimum rating of STC 25. In addition to the sound insulation required, video teleconferencing areas shall meet a Noise Criteria (NC) 30 rating in accordance with ASHRAE Fundamentals Handbook. Provide sound insulation to meet a minimum rating of STC 50/IIC 55 at floors separating sleeping spaces.

3.4.2.2 Sound conditions and levels for interior spaces, due to the operation of mechanical and electrical systems and devices, shall not exceed levels as recommended by ASHRAE handbook criteria. Provide acoustical treatment for drain lines and other utilities to prevent noise transmission into the interior of sleeping spaces.

3.4.3 Exterior Design Objectives

Provide durable and easily maintainable materials. Do not use exterior materials that require periodic repainting or similar refinishing processes. Material exposed to weather shall be factory pre-finished, integrally colored or provided with intrinsic weathering finish.

3.4.3.1 Exterior Walls: Provide durable materials. Where Exterior Insulation and Finish Systems (EIFS), or any other material except CMU or other Masonry material is used as exterior finish material, it shall be in conjunction with a CMU wainscot. EIFS shall be "high-impact" type and shall be "drainable" type.

3.4.3.2 Roof: Minimum roof slope for membrane roof systems shall be 1/2 inch per foot. Minimum roof slope for pitched roof systems shall be 3 inches per foot.

(a) Roof Mounted Equipment: For roof mounted equipment, provide permanent access walkways and platforms to protect roof. Roof mounted equipment on pitched roof systems is unacceptable.

(b) Roof access from building exterior is prohibited.

3.4.3.3 Trim and Flashing: Gutters, downspouts, and fascias shall be factory pre-finished metal and shall comply with SMACNA Architectural Sheet Metal Manual.

3.4.3.4 Bird Habitat Mitigation: The Contractor shall provide details in the design necessary to eliminate the congregating and nesting of birds at, on, and in the facility.

3.4.3.5 Exterior Doors and Frames:

(a) Main Entrance Doors: Aluminum storefront doors and frames with Architectural Class 1 anodized finish, fully glazed, with medium or wide stile for entry into lobbies or corridors. Provide doors complete with frames, framing members, subframes, transoms, sidelights, trim, applied muntins, and accessories. Framing systems shall have thermal-break design. Storefront systems shall comply with wind-load requirements of applicable codes and criteria including UFC 4-010-01.

(b) Exterior Non-entrance Doors: Exterior doors and frames opening to spaces other than corridors or lobbies shall be galvanized insulated hollow metal and comply with ANSI A250.8/SDI 100. Doors shall be heavy duty (grade 2) insulated with 18-gage steel cladding; top edge closed flush; A60 galvanized. Frames shall be 12-gauge, with continuously welded mitered corners and seamless face joints. Doors and frames shall be constructed of hot dipped zinc coated steel sheet, complying with ASTM A653, Commercial Steel, Type B, minimum A40 coating weight; factory primed. Fire-rated openings shall comply with applicable codes, and the requirements of the labeling authority. Door and frame installation shall comply with applicable codes and criteria including UFC 4-010-01.

3.4.3.6 Exterior Windows: Provide insulated, high efficiency window systems, with thermally broken frames complying with applicable codes and criteria including UFC 4-010-01. Curtain wall systems shall be capable of withstanding area wind loads, thermal and structural movement required by location and project requirements, and shall comply with applicable codes and criteria including UFC 4-010-01. Window sills shall be designed to discourage bird nesting.

3.4.3.7 Exterior Louvers: Exterior louvers shall have bird, bug and or both screens and shall be designed to exclude wind-driven rain. Exterior louvers shall be made to withstand wind loads in accordance with the applicable codes. Wall louvers shall bear the Air Movement & Control Association (AMCA) International certified ratings program seal for air performance and water penetration in accordance with AMCA 500-D and AMCA 511. Louver finish shall be factory applied.

3.4.4 Interior Design Objectives

Arrange spaces in an efficient, functional manner. Provide durable materials and furnishings that are easily maintained and replaced. Maximize use of daylighting. Provide interior surfaces that are easy to clean and light in color. Design B/COF barracks area with a residential ambience. Design B/COF company operations area with an office ambience. Interior spaces shall be structured to allow maximum flexibility for future modifications.

3.4.4.1 Signage: Provide room number sign with changeable two-line message strip signage. Changeable message strip signs shall be of same construction as standard room signs to include a clear sleeve that will accept a paper or plastic insert with identifying changeable text. The insert shall be prepared typeset message photographically enlarged to size and mounted on paper card stock.

3.4.4.2 Bulletin Boards: In each B/COF provide one bulletin board per floor. Locate bulletin board at the main vestibule on the first floor and at the entry vestibule on the second and third floors. Bulletin boards shall be 4 feet high and 6 feet wide. Bulletin boards shall have a header panel and shall have lockable, glazed doors.

3.4.4.3 Corner Guards: Provide surface mounted, high impact resistant, integral color, snap-on type resilient corner guards, extending from floor to ceiling for wall/column outside corners in high traffic areas. Factory fabricated end closure caps shall be furnished for top and bottom of surface mounted corner guards.

3.4.4.4 Chair Rail: Chair rails shall be installed in areas prone to hi-impact use, such as corridors and lobby seating area.

3.4.4.5 Casework: Provide cabinets complying with Architectural Woodwork Institute (AWI) Quality Standards. Countertops shall have waterfall front edge and integral coved backsplash.

3.4.4.6 Fire Extinguisher Cabinets and Fire Extinguishers: Furnish and install fire extinguisher cabinets as required by applicable codes and criteria. Fire extinguishers are GFGI. Furnish a list of installed fire extinguishers (including location, size and type) to the Contracting Officer's Representative.

3.4.4.7 Interior Doors and Frames:

(a) Provide hollow metal doors, or flush solid core wood doors as required. All door frames shall be hollow metal.

(b) Wood Doors: All doors shall be wood doors except noted otherwise Provide flush solid core wood doors conforming to WDMA I.S.-1A. Stile edges shall be non-finger jointed hardwood compatible with face veneer. Provide Architectural Woodwork Institute (AWI) Grade A hardwood face veneer for transparent finished doors.

(c) Insulated Hollow Metal Doors: Comply with ANSI A250.8/SDI 100. Doors shall be minimum Level 2, physical performance Level B, Model 2; factory primed. Provide insulated hollow metal doors for utility rooms, storage rooms and toilets.

(d) Hollow Metal Frames: Comply with ANSI A250.8/SDI 100. Frames shall be minimum Level 2, 16 gauge, with continuously welded mitered corners and seamless face joints; factory primed.

(e) Fire-rated and Smoke Control Doors and Frames: Comply with applicable codes, criteria and requirements of labeling authority.

(f) STC ratings shall be of the sound classification required and shall include the entire door and frame assembly.

3.4.4.8 Window Treatment: Treatment shall be provided in all exterior windows. Uniformity of window covering color and material shall be maintained to the maximum extent possible throughout each building. Window stools shall be minimum ½ inch thick cast 100 percent acrylic polymer solid surfacing material. Blinds in B/COF barracks area shall be room darkening mini blinds.

3.4.4.9 Toilet Accessories: Furnish and install the items listed below and all other toilet accessories necessary for a complete and usable facility. All toilet accessories shall be Type 304 stainless steel with satin finish. Toilet accessories shall include the following:

(a) Toilet/Showers:

- (1) Glass Mirror/Shelf – 18 inch by 24 inch glass mirror on stainless steel frame with shelf at each lavatory
- (2) Hands free liquid soap dispenser – at each lavatory
- (3) Hands free paper-towel dispenser
- (4) Waste receptacle – recessed mounted at each lavatory/toilet area
- (5) Sanitary napkin disposal at each female toilet
- (6) Toilet paper dispenser – lockable multiple roll at each toilet
- (7) Sanitary toilet seat cover dispenser – at each toilet stall
- (8) Shower curtain rod, extra heavy duty – at each shower stall
- (9) Shower curtain, white anti-bacterial nylon/vinyl fabric shower curtain – at each shower stall
- (10) Soap dish – in shower
- (11) Double robe hook – adjacent to shower enclosure entry
- (12) Grab bars – as required by ADA

(b) Sleeping Bay Toilet/Shower/Dressing: Accessories shall include:

- (1) Glass Mirror/Shelf – 18 inch by 24 inch glass mirror on stainless steel frame with shelf – at each lavatory
- (2) Hands free liquid soap dispenser – at each lavatory
- (3) Hands free paper towel dispenser at each lavatory/toilet area
- (4) Waste receptacle – recessed mounted at each lavatory/toilet area
- (5) Sanitary napkin disposal - at each toilet, in one toilet wing, in sleeping bay with gender separation wall
- (6) Toilet paper dispenser – lockable double toilet paper dispenser at each toilet
- (7) Sanitary toilet seat cover dispenser – at each toilet stall
- (8) Shower curtain rod, extra heavy duty – at each shower stall
- (9) Shower curtain, white anti-bacterial nylon/vinyl fabric shower curtain – at each shower stall
- (10) Soap dish – in each shower
- (11) Double robe hook – at each shower entry
- (12) Combination tumbler/6 toothbrush holder – at each lavatory

(c) Drill Instructor Toilet/Shower

- (1) Glass Mirror/Shelf – 18 inch by 24 inch glass mirror on stainless steel frame with shelf – at each lavatory
- (2) Liquid soap dispenser – at each lavatory
- (3) Combination paper towel dispenser/waste receptacle – recessed mounted at each lavatory/toilet area
- (4) Toilet paper dispenser – lockable double toilet paper dispenser at each toilet
- (5) Sanitary toilet seat cover dispenser – at each toilet
- (6) Shower curtain rod, extra heavy duty – at each shower stall
- (7) Shower curtain, white anti-bacterial nylon/vinyl fabric shower curtain – at each shower stall
- (8) Soap dish – in each shower
- (9) Double robe hook – in each shower dressing area
- (10) Combination tumbler/6 toothbrush holder – at each lavatory

3.4.5 Finishes

3.4.5.1 Paint

- (a) All paints used shall be listed on the "Approved Product List" of the Master Painters Institute (MPI). Application criteria shall be as recommended by MPI guide specifications for the substrate to be painted and the environmental conditions existing at the project site.
- (b) Exterior surfaces, except factory pre-finished material or exterior surfaces receiving other finishes shall be painted a minimum of one prime coat and two finish coats. Paints having a lead content over 0.06 percent by weight of nonvolatile content are unacceptable. Paints containing zinc-chromate, strontium-chromate, mercury or mercury compounds, confirmed or suspected human carcinogens shall not be used on this project. Exterior paints and coating products shall be classified as containing low volatile organic compounds (VOCs) in accordance with MPI criteria. Application criteria shall be as recommended by MPI guide specifications. Provide an MPI Gloss Level 5 Finish (semi-gloss), unless otherwise specified.
- (c) Interior surfaces, except factory pre-finished material or interior surfaces receiving other finishes, shall be painted a minimum of one prime coat and two finish coats. Paints having a lead content over 0.06 percent by weight of nonvolatile content are unacceptable. Paints containing zinc-chromate, strontium-chromate, mercury or mercury compounds, confirmed or suspected human carcinogens shall not be used on this project. Interior paints and coating products shall contain a maximum level of 150 grams per liter (g/l) of VOCs for non-flat coatings and 50 g/l of VOCs for flat coatings. Provide an MPI Gloss Level 5 Finish (semi-gloss) in wet areas and a flat finish in all other areas.

3.4.5.2 Minimum Interior Finishes-General

- (a) Designers are not limited to finishes listed in the following INTERIOR FINISHES table(s) and are encouraged to offer higher quality finishes.
- (b) Wall, ceiling and floor finishes and movable partitions shall conform to the requirements of the IBC, NFPA and UFC 3-600-01 Fire Protection Engineering for Facilities. Where code requirements conflict, the most stringent code requirement shall apply.
- (c) Carpet shall not be used as a floor finish in the B/COF. Vinyl composition tile (VCT) shall be minimum 1/8 inch thick, conforming to ASTM F 1066, Class 2, through pattern tile, Composition 1, asbestos free, with color and pattern uniformly distributed throughout the thickness of the tile.
- (d) All walls shall be minimum 5/8" painted gypsum board, except where stated otherwise. All gypsum board shall achieve a score of 10, the highest level of performance for mold resistance under the ASTM D 3273 test method. All gypsum board shall be transported, handled, stored and installed in accordance with the GYPSUM ASSOCIATION – Guidelines For Prevention Of Mold Growth On Gypsum Board (GA-238-03). Use impact resistant gypsum board in vestibule, corridors, stairs, laundry, vending areas and storage areas.
- (e) All ceilings shall be minimum 5/8" painted gypsum board, except where stated otherwise. All gypsum board shall achieve a score of 10, the highest level of performance for mold resistance under the ASTM D 3273 test method. All gypsum board shall be transported, handled, stored and installed in accordance with the GYPSUM ASSOCIATION – Guidelines For Prevention Of Mold Growth On Gypsum Board (GA-238-03).

3.4.5.3 B/COF Interior Finishes

B/COF INTERIOR FINISHES					
	Floors	Base	Walls	Ceiling	Remarks

	RESILIENT FLOORING	PORCELAIN OR QUARRY TILE	CERAMIC TILE	RECESSED ENTRY MAT	SEALED CONCRETE	RESILIENT BASE	PORCELAIN OR QUARRY TILE	CERAMIC TILE	GYPSUM WALL BOARD - PAINT	LAMINATED GLASS, INSUL. CURTAIN WALL SYSTEM	FULLY GROUTED REINF. CMU OR REINF. CONCRETE	CERAMIC TILE	GYPSUM WALL BOARD - PAINT	ACOUSTICAL CEILING TILE	REINF. CONCRETE	EXPOSED	MINIMUM HEIGHT 8' EXCEPT STATED OTHERWISE	REFER TO NOTE
1ST FLOOR																		
VESTIBULE		•		•			•		•	•			•				9'	
STAIR					•	•			•				•				9'	NOTE 6
RECEPTION/CQ		•					•		•				•				9'	
CO	•					•			•					•				NOTE 10
XO	•					•			•					•				
1ST SGT	•					•			•					•				
TRO	•					•			•					•				
MEN'S TOILET/SHOWER			•					•	•			•	•					NOTE 1 AND 4
WOMEN'S TOILET/SHOWER			•					•	•			•	•					NOTE 1 AND 4
JANITOR			•					•	•			•	•					NOTE 2
LUGGAGE STORAGE					•	•			•				•					
COMPANY SUPPLY					•	•			•				•					
SECURE STORAGE					•	•			•				•					
MASK STORAGE					•	•			•				•					
ARMS VAULT					•	•					•				•			
STAIRS					•	•			•	•			•					NOTE 6
CORRIDORS		•					•		•				•				9'	
QUEUING CORRIDOR		•					•		•				•				9'	
MULTIPURPOSE ROOM	•					•			•				•				9'	
SCRUB ROOM			•					•	•			•	•				9'	NOTE 4 AND 8
MECHANICAL					•	•			•				•			•		NOTE 9
ELECTRICAL					•	•			•							•		NOTE 9
TELECOMMUNICATIONS	•					•			•				•					NOTE 11
COVERED TRAINING AREA					•												9'	NOTE 7
2ND AND 3RD FLOOR																		
VESTIBULE					•		•		•	•			•				9'	
STAIR					•	•			•				•				9'	NOTE 6
SLEEPING BAY	•					•			•				•				9'	
TOILET/SHOWER/DRESSING			•					•	•			•	•					NOTE 1 AND 4
LAUNDRY		•					•		•				•					NOTE 4
STAIR	•				•	•			•	•			•					NOTE 6
CORRIDORS		•					•		•				•				9'	
DI OFFICE	•					•			•					•				
DI TOILET/SHOWER			•					•	•			•	•					NOTE 1 AND 4
PLATOON CLASSROOMS	•						•		•					•			10'	
STORAGE	•					•			•				•					
TA-50 STORAGE	•					•			•				•					

GENERAL STORAGE	•					•			•				•							
JANITOR			•					•	•				•	•						NOTE 2
MECHANICAL					•	•			•									•		NOTE 9
ELECTRICAL					•	•			•									•		NOTE 9
TELECOMMUNICATIONS	•					•			•					•						NOTE 11
1. ALL WET WALLS IN TOILET ROOMS SHALL HAVE 4'-0" HIGH CERAMIC TILE WAINSCOT. ALL SHOWERS SHALL HAVE FULL HEIGHT CERAMIC TILE WALLS. VANITY TOPS SHALL BE CAST 100 PERCENT ACRYLIC POLYMER SOLID SURFACING MATERIAL WITH WATERFALL FRONT EDGE AND INTEGRAL COV																				
2. WALLS ADJACENT TO JANITOR'S SINK SHALL HAVE A 4'-0" HIGH CERAMIC TILE WAINSCOT.																				
3. NOT USED																				
4. ALL COUNTERS SHALL HAVE A MINIMUM OF 4" HIGH BACKSPLASH.																				
5. NOT USED																				
6. RISERS SHALL BE PAINTED STEEL. STAIR LANDINGS AND TREADS SHALL HAVE RESILIENT FLOORING OR SEALED CONCRETE. PROVIDE TREADS WITH SLIP RESISTANT NOSING.																				
7. PAINT STRUCTURE.																				
8. PROVIDE 6'-0" HIGH CERAMIC TILE WAINSCOT ON ALL WALLS.																				
9. CEILING MAY BE PAINTED EXPOSED STRUCTURE IF ALLOWED BY APPLICABLE CODE.																				
10. EXTEND PARTITIONS TO DECK. PROVIDE SOUND INSULATION TO MEET A MINIMUM STC RATING OF 49 AT WALLS AND A STC OF 28 AT DOORS.																				
11. COMPLY WITH THE REQUIREMENTS OF ANSI/TIA/EIA-596-B																				

3.4.5.4 Not Used

3.4.5.5 Not Used

3.4.5.6 LEB Interior Finishes:

Floors shall be sealed concrete with a resilient base. Walls shall be painted impact resistant gypsum wallboard.

3.4.5.7 B/COF Furniture Chart

B/COF FURNITURE CHART		
Description	Comments	Furniture Required
Command Office (CO, XO, OPS SGT, 1st SGT)	Private Office	Executive double pedestal desk unit, storage credenza, two guest chairs, one executive chair - CO, XO (or) one managerial chair - OPS SGT, 1st SGT
Open Workstation (DI Office)	Open Workstation	Systems furniture workstation, with work surfaces, file pedestals, and overhead storage, one task chair, one guest chair
Multi-Purpose	Multi-Purpose	To be determined by Installation
Classroom	Classroom	60 seats. Tables shall be 18" width by 4'. length (2 chairs per table).
Arms Vault	Storage	1 workstation
Supply	Storage	Systems furniture workstation, with work surfaces, file pedestals, and overhead storage, one task chair. 21 Heavy-duty shelving units
Reception Area	Reception Area	Systems furniture open office area for one staff member and 4 guest chairs
Sleeping Bay	Barracks	60 beds, 60 wardrobes

3.4.5.8 Not Used

3.5 STRUCTURAL REQUIREMENTS

Design and construct as a complete system in accordance with APPLICABLE CRITERIA.

3.5.1 Live Loads: Design live loads shall be per IBC but not lower than the following minimums:

- | | | |
|-----|-------------------------------------|---|
| (a) | Elevated Floors | 60 pounds per square foot (psf) minimum |
| (b) | Slab On Grade | 150 psf minimum |
| (c) | Barracks Bays w/o Partitioned Rooms | 80 psf |
| (d) | Centralized Laundry Area | 150 psf, (but not less than actual equipment loads) |

3.6 MECHANICAL REQUIREMENTS

3.6.1 Plumbing

3.6.1.1 Domestic water heating system shall be sized in accordance with UFC 3-420-01, Appendix E, except as amended herein. Hot water consumption shall be based on 2 gpm per shower head with a delivered temperature of 110 deg F. Peak period duration shall be 19 minutes (3 groups with 5 minutes of shower operation each and 2 minutes of transition between groups). In addition to simultaneous shower operation, all lavatories and washing machine demand must be included without diversity. Hot water storage capacity shall be based on 75% usable storage and a storage temperature of 140 deg F. Domestic hot water shall be provided by separate water heating boiler and tank systems or storage water heating systems, located within the barracks mechanical rooms.

Domestic hot and cold water pipe sizing shall be based on all fixtures operating simultaneously. Waste stacks, building waste drains, venting and lift stations shall be sized with consideration to the increased flow rates as well.

Domestic hot and cold water hose bibs shall be provided in laundry rooms and latrines for use in area cleanup/wash down.

Shower heads and lavatory faucets shall be water conserving type with a maximum rated flow rate of 2.0 gpm or less. Water closets shall be the siphon jet, flush valve type. All water closet and lavatory fixtures shall be hands free type operation.

3.6.1.2 Provide scrub room and boot wash drains with easily maintainable sand interceptors.

3.6.1.3 Laundry facilities shall be considered commercial laundries with respect to the International Plumbing Code (IPC) and shall be provided with easily maintainable solids interceptor(s) in accordance with the IPC.

3.6.1.4 Not Used

3.6.1.5 Drain Water Heat Recovery System. Gravity Film Heat Exchanger (GFX) is a vertical counter flow heat exchanger that extracts heat out of drain water and applies it to preheat the cold water and mixed with hot water to be used in the shower. The GFX consists of a 3 or 4 inch central copper pipe (that carries the warm waste water) with a 1/2-inch copper coils wound around the central pipe. Heat is transferred from the waste water passing through the large, central pipe to the cold water simultaneously moving upward through the coils on the outside of the pipe. GFX shall be provided on all shower drains and laundry drains.

3.6.2 Heating, Ventilating and Air-Conditioning (HVAC)

3.6.2.1 All HVAC air handling units shall be located in mechanical equipment rooms accessible through equipment room doors. Mechanical rooms shall be sized for ease of service and maintenance of equipment. Access for maintenance shall not require entry into the sleeping bays or classrooms. Air filters shall be located in duct or unit mounted filter boxes within the mechanical room. HVAC system selection shall be in accordance to ASHRAE 90.1. The HVAC system shall provide continuous outside air ventilation to each space and centralized exhaust systems

with heat recovery between exhaust and the incoming outside air.

(a) Storage and laundry spaces may be served by single zone heating and ventilating fan coil and/or forced air systems, respectively. Laundry rooms must be provided with sufficient tempered makeup air either from transfer air via the air handling systems serving the sleeping bays or their own air handling systems. Storage and electrical spaces must be ventilated to limit summer interior temperatures and minimally heated (45 deg F). Communications spaces require separate cooling (24 hour cooling if required by the Installation Directorate of Information Management (DOIM) or similar organization).

(b) HVAC design loads must include plug loads of 6 watts/sf in classrooms and 1.5 watts/sf in sleeping bays. HVAC design loads must also account for surge population in sleeping bays and classrooms.

(c) Heating, mechanical ventilation and air-conditioning shall be in accordance with ASHRAE Standard 62; design supply air volumes in occupied spaces shall be not less than 0.8 cubic feet/minute/square foot (cfm/sq. ft). Heating and cooling load calculations shall allow for a minimum of 0.3 air changes per hour from incidental infiltration for all building spaces. For severe winter climatic areas incorporation of low intensity, gas-fired infrared heating systems may be considered for adjoining covered training or assembly areas.

Continuous ventilation air must be provided throughout each building for indoor air quality, building pressurization, and makeup of exhausted air. Exhaust airflows and people ventilation shall be provided as required by ASHRAE Standard 62. In sleeping areas, provide either 15 cubic feet/min./person or 10% of supply airflow for building pressurization plus makeup air for all exhausts, whichever is greater. Exhaust calculations shall include all dryers on at same time (200 cubic feet/min./dryer) and exhaust for shower, drying areas and toilet exhaust, etc. The overall building shall be positively pressurized by approximately 10% to exclude unplanned infiltration. All ventilation air shall be provided using one or more dedicated outdoor air units. Dedicated outdoor air units shall continuously supply dehumidified, tempered air to the building. Supply air conditions from the dedicated outdoor air unit(s) shall be between 70 and 75 degrees F dry bulb and no greater than 51 degrees F dew point.

(d) For purposes of prevention of respiratory illness, supply and return air in sleeping bays must be arranged to prevent air movement across multiple bunks. Supply and return air must be ducted to air distribution devices located between every other bunk.

(e) Ductwork in sleeping bays shall be designed to prevent placement or concealment of contraband. Round ductwork is recommended. Ductwork and controls shall also be designed to provide two separate zones within each sleeping bay such that a longitudinal privacy partition may be installed to divide the bay.

(f) For freeze protection, air handling unit heating coils shall either be placed in the pre-heating position or preheating coils shall be provided where mixed air temperature may fall below design cooling supply air temperatures or less than 45 degrees F or where stratification may occur. Freeze protection provisions shall be specifically documented.

3.6.2.2 Due to possible fluctuations in trainee populations, HVAC controls must incorporate controls software and hardware to facilitate building or space shutdown or reduced utilization at various times during the year. During unoccupied times buildings or spaces must continue to be minimally heated (55 deg F), cooled (85 deg F dry bulb, 55 deg dew point) and ventilated (0.06 cfm/sf) to conserve energy, preclude molding problems, etc.

3.6.2.3 Not Used

3.6.2.4 Not Used

3.6.3 Fire Protection

Fire suppression systems shall be designed in accordance with the latest edition of UFC 3-600-01. However, the B/COF shall be classified as mission essential and shall be provided with sprinkler protection regardless of other criteria or code provisions. The facility shall be protected throughout by a complete automatic sprinkler system. Fire alarm systems shall be addressable type with addressable devices. The type, function and location of the fire alarm annunciator shall be coordinated with the local authority having jurisdiction.

3.7 ELECTRICAL AND TELECOMMUNICATIONS REQUIREMENTS

Select electrical characteristics of the power system to provide a safe, efficient, and economical distribution of power based upon the size and types of loads to be served. Use distribution and utilization voltages of the highest

level that is practical for the load to be served. The effect of nonlinear loads such as computers, other electronic equipment and electronic ballasts shall be considered and accommodated as necessary. Voltage drop shall not exceed the maximum allowed per ASHRAE 90.1. Transient voltage surge protection shall be provided on service equipment.

3.7.1 Power

Power shall be provided for all installed equipment requiring power including all Government Furnished Contractor Installed equipment and all GFGI equipment. Power poles are not allowed. The following shall also be provided.

3.7.1.1 Provide 125-volt duplex receptacles per NFPA 70 in conjunction with the proposed equipment and furniture layouts, and as per other stated requirements elsewhere in the RFP.

3.7.1.2 In addition to receptacles required elsewhere in the RFP provide one 125-volt duplex receptacle per wall in all normally occupied spaces unless otherwise noted.

3.7.1.3 For housekeeping purposes provide a minimum of one 125-volt, duplex receptacle per corridor and a minimum of one 125-volt duplex receptacle in the lobby . No point along bottom of corridor or lobby walls shall be more than 25 feet from a receptacle.

3.7.1.4 Provide 125-volt duplex receptacles mounted adjacent to lavatories. Provide a minimum of one for every two adjacent lavatories-. Each single lavatory shall also be provided a receptacle

3.7.1.5 Provide a- minimum of two 125-volt, duplex receptacles shall be provided in each mechanical room- in addition to NFPA 70 requirements. In addition, provide a minimum of one 125-volt duplex receptacle in each electrical room.

3.7.1.6 Provide six 125-volt duplex receptacles spaced evenly along exterior walls in each sleeping bay and two evenly spaced along each end wall.

3.7.1.7 Not Used

3.7.1.8 Not Used

3.7.1.9 Provide a minimum of two 125-volt, duplex receptacles in each of the separate secure spaces within the LEB. One receptacle shall be placed near the overhead roll up door and one shall be placed on the wall opposite the door.

3.7.2 Grounding

Grounding shall be provided in accordance with NFPA 70 and UFC 3-580-01 Telecommunications Bldg Cabling Systems Planning/Design. In addition raised flooring shall be grounded to the building's primary grounding electrode.

3.7.3 Lighting

Interior lighting controls shall be provided in accordance with ASHRAE 90.1. Compact fluorescent lamps of 12 watts or less shall not be used.

3.7.3.1 Specific Requirements

- (a) Local manual controls shall supplement automatic controls in offices, classrooms and specialized areas such as scrub rooms, multipurpose rooms and covered training areas.
- (b) An un-switched fixture with emergency ballast shall be provided at the entrance to each arms vault.
- (c) Covered training areas shall be illuminated to a level of 15 foot-candles.
- (d) Reception area shall be illuminated to a level of 10 foot-candles. CQ workstation within the lobby shall be illuminated to a level of 30 foot-candles.

(e) Mechanical rooms, supply rooms, arms vault, TA-50 storage rooms, multipurpose rooms, mask storage room and electrical rooms shall be illuminated to a level of 30 foot-candles.

3.7.3.2 Not Used

3.7.3.3 Each secure space within the LEB shall be illuminated to a level of 10 foot-candles and each space shall be separately switched.

3.7.4 Telecommunications System

Telecommunication outlets shall be provided per the applicable criteria based on functional purpose of the space within the building and in accordance with other provisions of this RFP.

3.7.4.1 Provide voice and data connection capability to all workstations.

3.7.4.2 The required connection capability in classrooms is a minimum of one voice and one data outlet per room or partitioned area within the room.

3.7.4.3 Connectivity shall be provided for 10 pay phones within each covered training areas per local telephone company requirements.

3.7.4.4 Equipment racks shall be 84 inches in height.

3.7.4.5 In addition to the cable tray requirements in the UFC 3-580-01 Telecommunications Bldg Cabling Systems Planning/Design, cable tray shall be installed around the entire perimeter of all telecommunications rooms.

3.7.5 Video Teleconferencing

Provide a dual (fiber optic and 8-pin modular)jack outlet for video teleconferencing connectivity in each:classroom

3.7.6 Intrusion Detection System (IDS)

3.7.6.1 An Intrusion Detection System (IDS) shall be provided for each arms vault. Provide a control panel, balanced magnetic switch, motion sensor, and duress switch unless specified otherwise in paragraph 6. System requirements shall be coordinated with the Installation.

3.7.6.2 Not Used

3.7.7 Cable Television (CATV)

All CATV outlet boxes, connectors, cabling, and cabinets shall conform to the UFC 3-580-01 Telecommunications Bldg Cabling Systems Planning/Design unless noted otherwise. All horizontal cabling shall be homerun from the CATV outlet to the nearest telecommunications room.

3.7.7.1 CATV connectivity shall be provided in: all classrooms, multipurpose rooms, drill instructor offices and private offices. See paragraph 6 for additional requirements.

3.7.7.2 Not Used

3.7.8 Mass Notification

Mass notification system shall meet intelligibility requirements up to a distance of 30' from the building's perimeter and in all court yards. Visible notification appliances are not required on the building's exterior walls.

3.7.9 Not Used

3.7.10 Not Used

3.7.11 Not Used

3.7.12 Door Status/Alarm Monitoring System

A door monitoring system consisting of a door status/alarm panel and door balanced magnetic switches shall be provided. The monitoring system shall provide door status/alarms on all doors leading into and within sleeping bays in order to accommodate gender segregation. System shall allow each door alarm to be individually activated or deactivated. Door status/alarm panel shall be located in the reception area near the CQ workstation. Panel shall provide both an audio and visual signal when alarm is activated.

3.7.13 Audio/Visual System

Provide an empty 1" conduit (with pull wire) above the ceiling from each GFGI ceiling mounted projector location to a wall mounted outlet box at the front of each classroom and conference room..

3.8 FIRE ALARM REQUIREMENTS

3.8.1 There shall be one complete addressable Fire Alarm System for each building. This system shall consist of a Fire Alarm Panel, a communication device, initiating devices and notification devices. Class A addressable systems shall be installed.

3.8.2 All software, software locks, special tools and any other proprietary equipment required to maintain, add devices to or delete devices from the system, or test the Fire Alarm system shall become property of the Government and be furnished to the Contracting Officer's Representative prior to final inspection of the system.

3.8.3 The fire alarm system shall be designed by a professional Fire Protection Engineer and installed by a National Institute for Certification of Engineering Technologies (NICET) 3 technician.

3.8.4 Smoke detectors shall be provided in all sleeping bays. Smoke detectors in bedrooms shall be monitored. Tampering with a smoke detector shall send a trouble signal. Trouble signals shall be transmitted to the fire department.

3.9 COMPLIANCE WITH THE ENERGY POLICY ACT OF 2005 (EPACT 2005)

3.9.1 EPACT 2005 Requirement

The building, including the building envelope, HVAC systems, service water heating, power, and lighting systems shall be designed to achieve an energy consumption that is at least 30% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-2004 (see paragraph 5.9 Energy Conservation)

3.9.2 Target Energy Consumption Budget - B/COF

The target energy consumption budget (excluding plug loads) for B/COF facility located in Climate Zone 85 kBTU per ft² per year or less. The use of the Prescriptive Technology Solution Set, shown below, will result in an annual energy consumption less than or equal to the target energy budget figure.

3.9.3 Prescriptive Path (Use of Technology Solution Set)

The technology solution set shown in the table below achieves the above energy performance and life cycle cost effectiveness requirements for an BT/BCOF facility in the indicated DOE climatic zone.

Climate Zone 3A, Prescriptive Technology Solution Table

Item	Component	30% Solution
Roof	Attic	R-40
	Surface reflectance	0.27
Walls	Light Weight Construction	R-20

Exposed Floors	Mass	R-10 c.i.
Slabs	Unheated	NR ⁽²⁾
Doors	Swinging	U-0.70
	Non-Swinging	U-1.45
Infiltration		0.25 cfm/ft ² @ 75 Pa ⁽³⁾
Vertical Glazing	Window to Wall Ratio (WWR)	10% - 20%
	Thermal transmittance	U-0.45
	Solar heat gain coefficient (SHGC)	0.31
Interior Lighting	Lighting Power Density (LPD)	0.9 W/ft ²
	Ballast	Electronic ballast
HVAC	Air Conditioner	4-Pipe Fan Coil with central chiller and boiler plus DOAS ⁽⁴⁾ with 14.0 SEER DX coil (3.52 COP) and HHW coil on central boiler SAT control 55°F – 62°F with OAT 75° – 54°F
	Gas Furnace	none
	ERV	70% - 75% sensible effectiveness
Economizer		NR
Ventilation	Outdoor Air Damper	Motorized control
	Demand Control	NR
	Laundry Room	Decoupled ⁽⁵⁾
Ducts	Friction Rate	0.08 in. w.c./100 feet
	Sealing	Seal class B
	Location	Interior only
	Insulation level	R-6 ⁽⁶⁾
Service Water Heating	Gas storage	90% E _t
Drain Water Heat Recovery	None	Showers and washing machines drains only --30% efficient

Notes for Prescriptive Solution Technology Table:

- (1) NOT USED
- (2) NR means there is no requirement or recommendation for a component in this climate.
- (3) Increased Building Air tightness. Building air leakage (measured in cfm/ft²) is the average volume of air (measured in cubic feet per minute) that passes through a unit area of the building envelope (measured in square feet) when the building is maintained at a specified internal pressure (measured in Pascals). Testing requirements are specified in Chapter 5..
- (4) Dedicated Outdoor Air System. A central dedicated outdoor air system (DOAS) providing the following:
 - (a) Outside air for building indoor air quality and humidity control
 - (b) Make-up air for bathroom and kitchen exhausts
 - (c) Building pressurization to prevent infiltration which allows for reduction of heating/cooling and moisture loads on the system.

NOTE: The Central DOAS does not provide sensible heating or cooling. Sensible loads are provided by a complementing heating and cooling system

(5) Decoupling exhaust and supply systems for laundry rooms. To reduce unneeded energy use for heating and cooling of the make-up air and for air transportation of supply and exhausted air from the dryers, laundry exhaust and supply systems are separated in the efficient building model from the rest of the building exhaust and supply systems. Laundry exhaust system and corresponding make-up systems operate only when dryers are operating.

(6) The duct and pipe insulation values are from the ASHRAE Advanced Energy Design Guide for Small Offices.

All design features of this EPACT 2005 compliant facility not described above will be in accordance with the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-2007 including conformance with paragraph 5.9.2, which requires purchase of Energy Star and FEMP designated products.

3.9.4 Compliance Path

When the "Compliance Path" is selected, the facility design shall include a uniquely developed technology solution set which can be shown by the design analysis (using facility energy simulation software) not to exceed the target energy consumption budget stated in 3.6.2 above and meet all the criteria in the DOE interim final rule: "Energy Conservation Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings and New Federal Low-Rise Residential Buildings".

3.9.5 Schedules

If a unique technology solution set method of compliance is chosen then the following facility schedules must be used in all facility energy simulations for purposes of showing compliance with 3.6.4. Additionally, for simulation of a baseline building model, the "baseline values" for each component shall be as per ASHRAE Standard 90.1-2004 Building Envelope Requirements table for applicable climate zone and residential construction.

Training Barracks Sleeping Bays Internal Load Schedules

Hr	Occupancy			Lighting			Plug Loads			Service Hot Water		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1	1.00	1.00	1.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
2	1.00	1.00	1.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
3	1.00	1.00	1.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
4	1.00	1.00	1.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
5	1.00	1.00	1.00	0.90	0.90	0.90	0.05	0.05	0.05	0.10	0.10	0.10
6	0.00	0.00	0.00	0.50	0.50	0.50	0.05	0.05	0.05	0.00	0.00	0.00
7	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05	0.00	0.00	0.00
8	1.00	1.00	1.00	0.90	0.90	0.90	0.05	0.05	0.05	1.00	1.00	1.00
9	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05	0.00	0.00	0.00
10	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05	0.00	0.00	0.00
11	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05	0.00	0.00	0.00
12	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05	0.00	0.00	0.00
13	0.50	0.50	0.50	0.90	0.90	0.90	0.05	0.05	0.05	0.00	0.00	0.00
14	0.50	0.50	0.50	0.90	0.90	0.90	0.05	0.05	0.05	0.00	0.00	0.00
15	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05	0.00	0.00	0.00
16	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05	0.00	0.00	0.00
17	0.00	0.00	0.00	0.10	0.10	0.10	0.05	0.05	0.05	0.00	0.00	0.00
18	0.50	0.50	0.50	0.90	0.90	0.90	0.50	0.50	0.50	0.10	0.10	0.10
19	1.00	1.00	1.00	0.90	0.90	0.90	0.50	0.50	0.50	0.10	0.10	0.10
20	1.00	1.00	1.00	0.90	0.90	0.90	0.50	0.50	0.50	0.10	0.10	0.10
21	1.00	1.00	1.00	0.50	0.50	0.50	0.25	0.25	0.25	0.10	0.10	0.10

22	1.00	1.00	1.00	0.20	0.20	0.20	0.05	0.05	0.05	0.00	0.00	0.00
23	1.00	1.00	1.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
24	1.00	1.00	1.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
Peak	72 occ/floor			1.0 W/ft ²			0.25 kW/ft ²			1770 gal/hr		

Hr	Washer/Dryer			Washer SHW		
□	Wk	Sat	Sun	Wk	Sat	Sun
18-Jan	0.00	0.00	0.00	0.00	0.00	0.00
19-21	1.00	1.00	1.00	1.00	1.00	1.00
22-24	0.00	0.00	0.00	0.00	0.00	0.00
Peak	8.4kW/zone			80gal/hr		

Training Barracks Sleeping Bay Thermostat Set-Point Schedules

Hr	Heating (°F)			Heating (°C)			Cooling (°F)			Cooling (°C)		
□	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
24-Jan	70	70	70	20	20	20	75	75	75	24	24	24

Training Barracks Company Operations First Floor Internal Load Schedules

Hr	Occupancy			Lighting			Plug Loads			Service Hot Water		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
2	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
3	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
4	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
5	0.07	0.07	0.07	0.90	0.90	0.90	0.05	0.05	0.05	0.10	0.10	0.10
6	0.07	0.07	0.07	0.50	0.50	0.50	0.05	0.05	0.05	0.00	0.00	0.00
7	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
8	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.10	0.00	0.00
9	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.50	0.05	0.05
10	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.10	0.05	0.05
11	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.10	0.05	0.05
12	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.10	0.05	0.05
13	0.50	0.50	0.50	0.50	0.20	0.20	0.50	0.20	0.20	0.10	0.05	0.05
14	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.10	0.05	0.05
15	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.10	0.05	0.05
16	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.10	0.05	0.05
17	0.90	0.20	0.20	0.50	0.20	0.20	0.50	0.20	0.20	0.00	0.00	0.00
18	0.20	0.20	0.20	0.50	0.20	0.20	0.25	0.20	0.20	0.00	0.00	0.00
19	0.07	0.07	0.07	0.05	0.05	0.05	0.10	0.05	0.05	0.00	0.00	0.00
20	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
21	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
22	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
23	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
24	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
Peak	15 occ/floor			1.0 W/ft ²			0.35 kW/ft ²			10 gal/hr		

Training Barracks Company Operations First Floor Thermostat Set-Point Schedules

Hr	Heating (°F)			Heating (°C)			Cooling (°F)			Cooling (°C)		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
24-Jan	70	70	70	20	20	20	75	75	75	24	24	24

Training Barracks Company Operations 2nd & 3rd Internal Load Schedules

Hr	Occupancy			Lighting			Plug Loads			Service Hot Water		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
2	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
3	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
4	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
5	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.10	0.10
6	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
7	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.00	0.00
8	0.05	0.05	0.05	0.50	0.20	0.20	0.05	0.05	0.05	0.10	0.00	0.00
9	0.05	0.05	0.05	0.50	0.20	0.20	0.05	0.05	0.05	0.10	0.05	0.05
10	0.25	0.10	0.10	0.50	0.20	0.20	0.50	0.10	0.10	0.20	0.05	0.05
11	0.50	0.10	0.10	0.50	0.20	0.20	0.50	0.10	0.10	0.20	0.05	0.05
12	0.10	0.10	0.10	0.50	0.20	0.20	0.10	0.10	0.10	0.20	0.05	0.05
13	0.10	0.10	0.10	0.50	0.20	0.20	0.10	0.10	0.10	0.20	0.05	0.05
14	0.25	0.10	0.10	0.50	0.20	0.20	0.50	0.10	0.10	0.20	0.05	0.05
15	0.50	0.10	0.10	0.50	0.20	0.20	0.50	0.10	0.10	0.20	0.05	0.05
16	0.10	0.10	0.10	0.50	0.20	0.20	0.10	0.10	0.10	0.10	0.05	0.05
17	0.05	0.05	0.05	0.50	0.20	0.20	0.05	0.05	0.05	0.10	0.05	0.05
18	0.05	0.05	0.05	0.50	0.20	0.20	0.05	0.05	0.05	0.00	0.00	0.00
19	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
20	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
21	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
22	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
23	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
24	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00
Peak	15 occ/floor			1.0 W/ft ²			0.35 kW/ft ²			10 gal/hr		

Training Barracks Company Operations 2nd & 3rd Floor Thermostat Set-Point Schedules

Hr	Heating (°F)			Heating (°C)		
	Wk	Sat	Sun	Wk	Sat	Sun
24-Jan	55	55	55	12.8	12.8	12.8

BT/COF Unoccupied Zones (ie stairwells, mechanical rooms) Thermostat Set-Point Schedules

Hr	Heating (°F)			Heating (°C)			Cooling (°F)			Cooling (°C)		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
2	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
3	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
4	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
5	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4

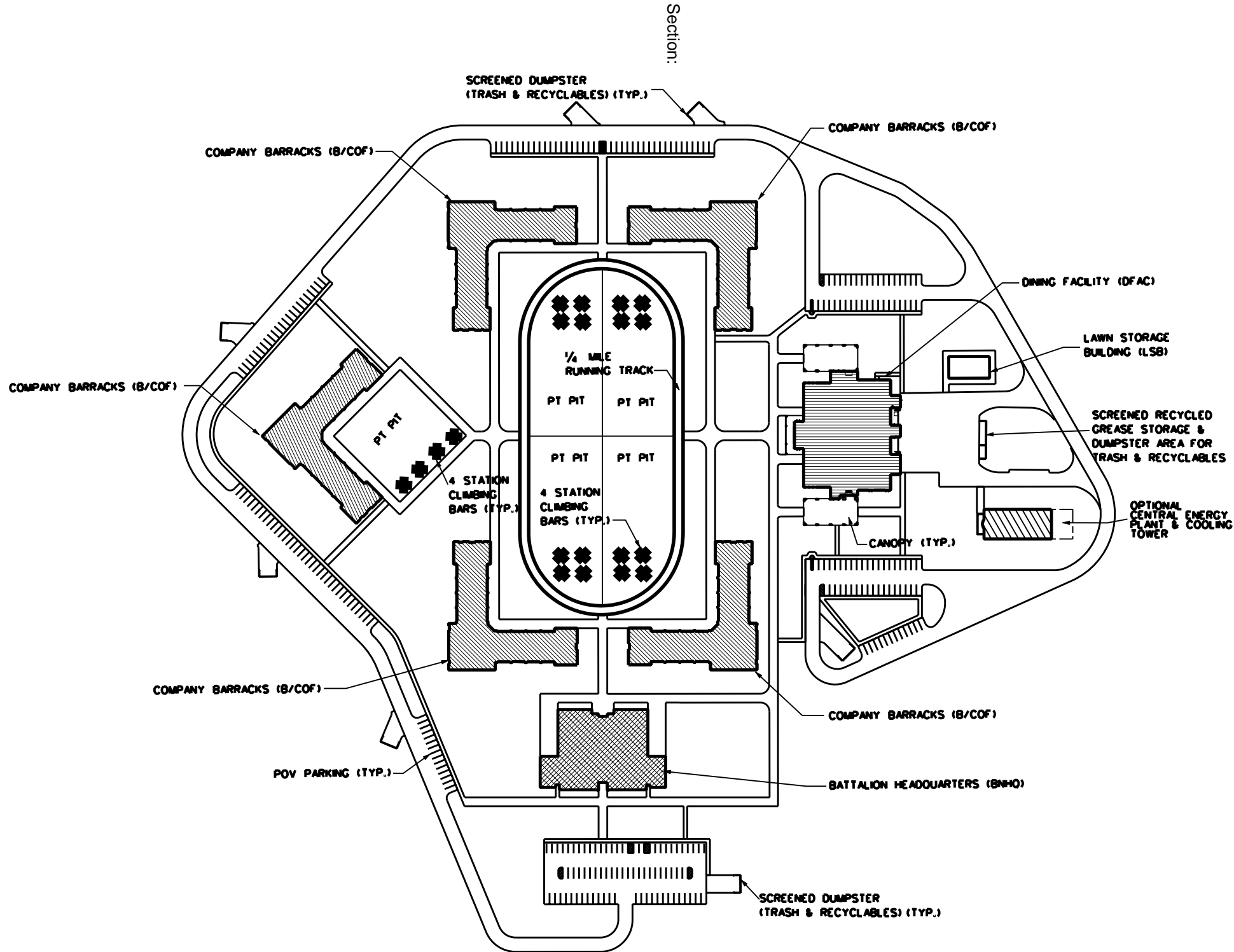
6	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
7	70	70	70	21	21	21	75	75	75	24	24	24
8	70	70	70	21	21	21	75	75	75	24	24	24
9	70	70	70	21	21	21	75	75	75	24	24	24
10	70	70	70	21	21	21	75	75	75	24	24	24
11	70	70	70	21	21	21	75	75	75	24	24	24
12	70	70	70	21	21	21	75	75	75	24	24	24
13	70	70	70	21	21	21	75	75	75	24	24	24
14	70	70	70	21	21	21	75	75	75	24	24	24
15	70	70	70	21	21	21	75	75	75	24	24	24
16	70	70	70	21	21	21	75	75	75	24	24	24
17	70	70	70	21	21	21	75	75	75	24	24	24
18	70	70	70	21	21	21	75	75	75	24	24	24
19	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
20	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
21	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
22	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
23	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4
24	60	60	60	15.6	15.6	15.6	85	85	85	29.4	29.4	29.4

ATTACHMENT A

BT COMPLEX DRAWINGS AND DETAILS

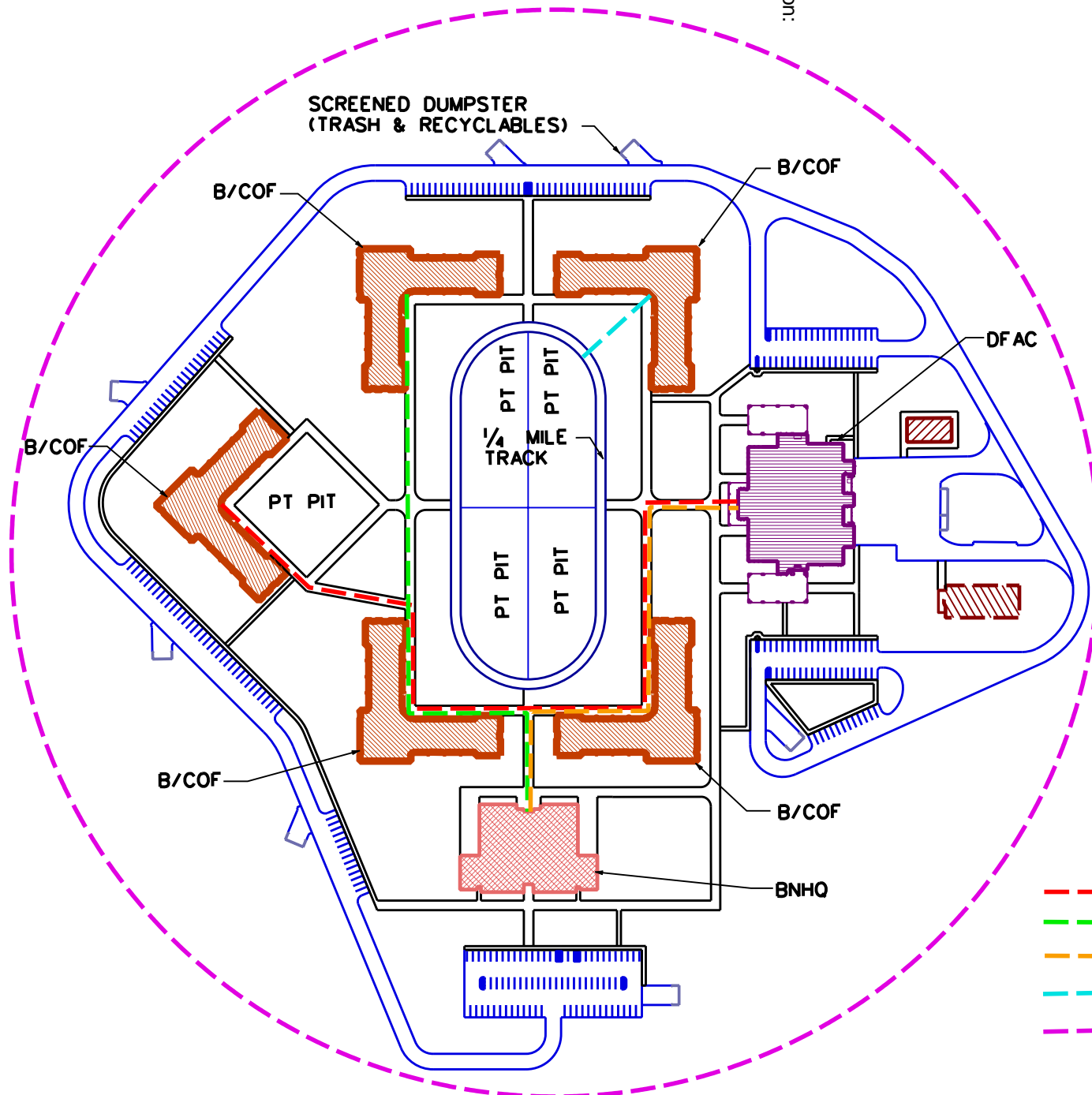
Index

- BARRACKS/COMPANY OPERATIONS (B/COF) FLOORPLANS
- CONCEPTUAL COMPLEX SITE PLAN
- ESTABLISHED TRAVEL DISTANCES BETWEEN FACILITIES IN COMPLEX
- TYPICAL RUNNING TRACK LAYOUT
- TYPICAL TRACK CROSS SECTION
- SPECIFICATION SECTION 02 83 30 SYNTHETIC SPORTS SURFACE
- PT PIT CLIMBING BAR DETAILS



**CONCEPTUAL BT/OSUT COMPLEX
SITE LAYOUT PLAN**

Section:

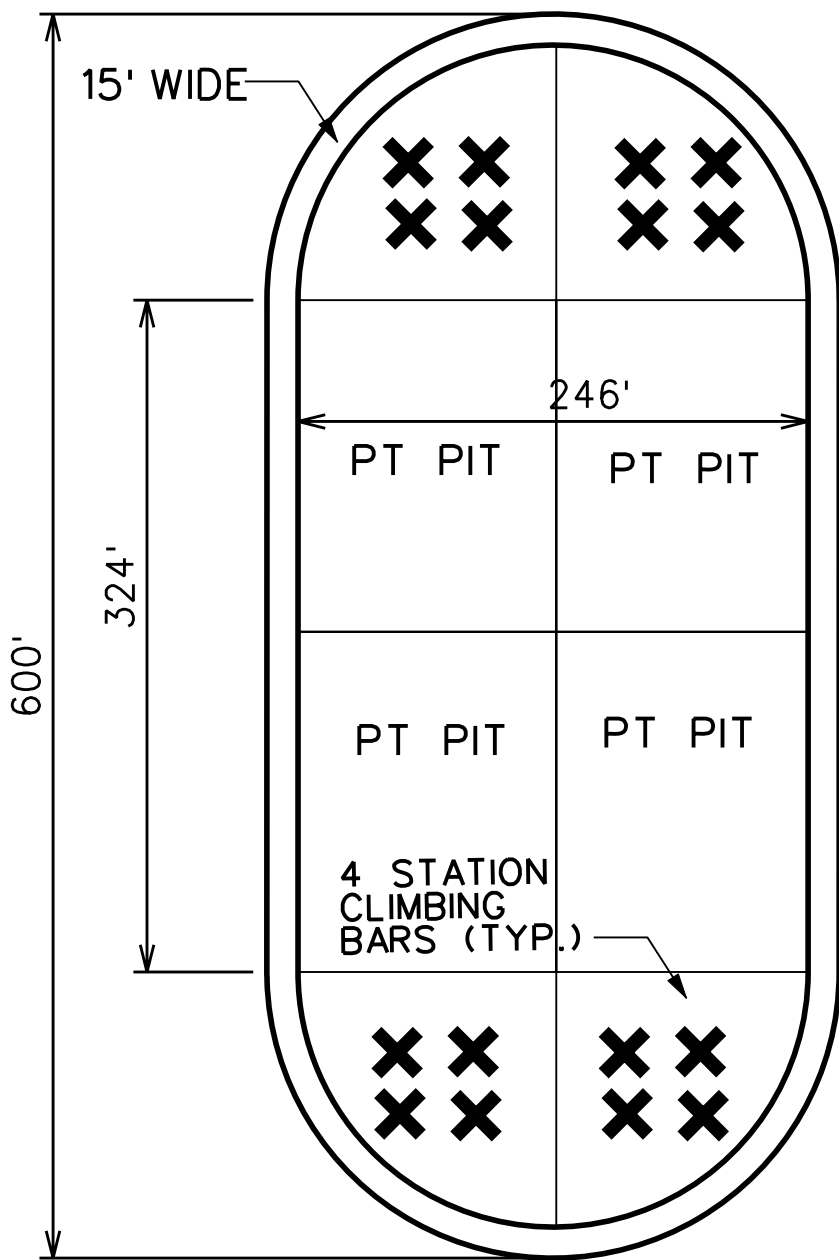


DISTANCE LEGEND

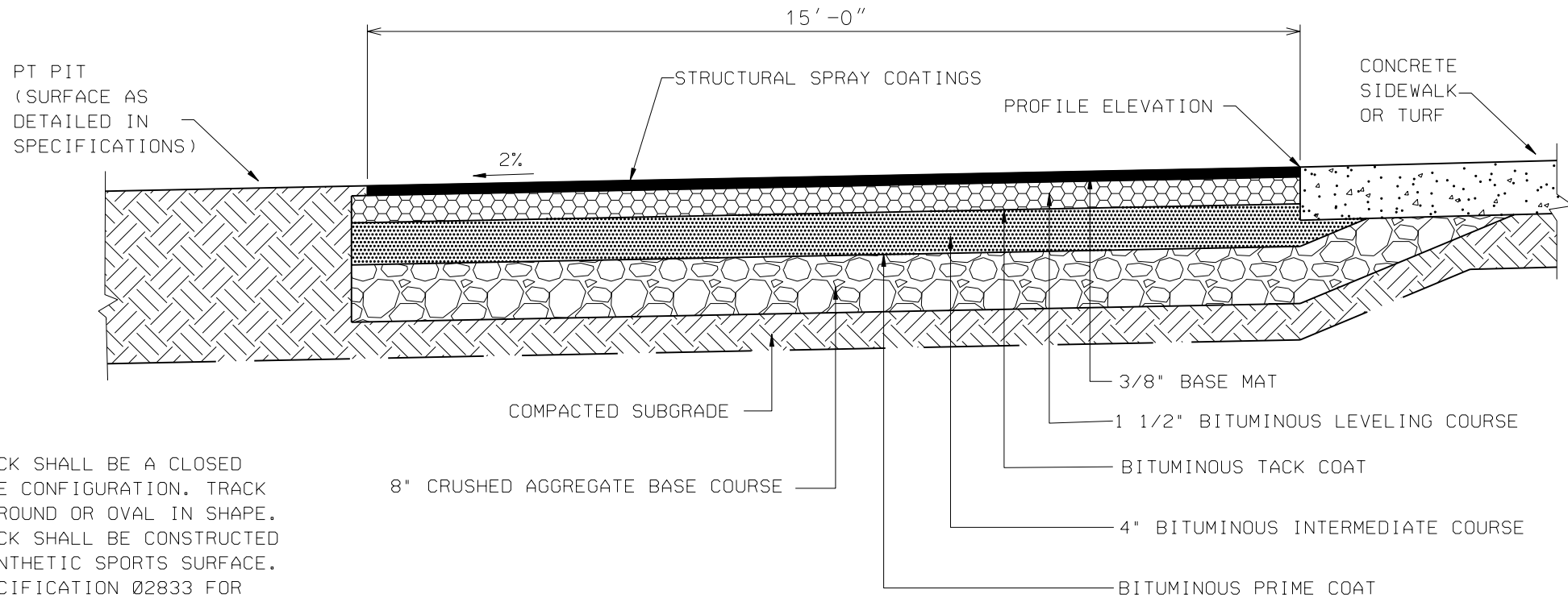
- B/COF to DFAC 1324' (5.5 min.)
- B/COF to BNHQ 985' (4.1 min.)
- BNHQ to DFAC 788' (3.3 min.)
- B/COF to PT PITS 145' (0.6 min.)
- 1680' RECOMMENDED MAXIMUM DISTANCE BETWEEN B/COF AND OTHER FACILITIES (10 min. from a 3 Story Facility)

BASIC TRAINING AND ONE STATION UNIT TRAINING (BT/OSUT) COMPLEX
(31 ACRES AS SHOWN)

Section:



Section:



NOTE:

THE TRACK SHALL BE A CLOSED 1/4 MILE CONFIGURATION. TRACK MAY BE ROUND OR OVAL IN SHAPE. THE TRACK SHALL BE CONSTRUCTED OF A SYNTHETIC SPORTS SURFACE. SEE SPECIFICATION 02833 FOR MATERIAL AND INSTALLATION REQUIREMENTS. TRACK AND PT PITS SHALL BE DESIGNED WITH SURFACE AND/OR SUBSURFACE DRAINAGE, AS REQUIRED TO ELIMINATE ALL STANDING WATER.

ATHLETIC RUNNING TRACK TYPICAL CROSS SECTION

NOT TO SCALE

FIGURE 2- RUNNING TRACK

SECTION 02 83 30

SYNTHETIC SPORTS SURFACE

01/03

PART 1 GENERAL

The product shall be an impermeable, synthetic sports surface, designed for track and field activities. The system shall consist of a base mat, and of recycled rubber granules bound with a polyurethane binder and a impermeable layer of bi-component urethane coating, and a pigmented spray-applied top finish of polyurethane spray-coating and EPDM rubber granules. The system shall be installed on site.

1.2 SUBMITTALS

The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Synthetic Sports Surface Material

The Contractor shall submit descriptive technical data on the primers, granules, impermeable layer, structural spray coating, and line marking paint.

The Contractor shall provide written instructions provided by the manufacturer of all the materials used in the construction of the synthetic running track.

SD-07 Certificates

Synthetic Sports Surface Material

The Contractor shall provide documentation showing that the installer and supplier meet the qualifications listed.

1.4 WARRANTY

The product shall be warranted against defects in workmanship, labor, and materials for 60 months at no extra cost to the government.

PART 2 PRODUCTS

2.1 PRIMER

Polyurethane-based primers shall be compatible with the base and track surfacing materials.

2.2 BLACK RECYCLED RUBBER GRANULES

The rubber granules for the base mat shall be recycled rubber, processed and chopped to 0.029 to 0.118 inches, containing less than 4% dust.

2.3 POLYURETHANE BINDER

Binder for the black rubber mat shall be an MDI-based mono-component, polyurethane binding agent. The binding agent shall not have a free TDI monomer level above 0.2%, must be clear in color, not milky, and must be solvent free. The binding agent must be specially formulated for compatibility with SBR stranded or rubber crumb.

2.4 EPDM GRANULES

The rubber granules for the structural spray wearing coats shall be EPDM peroxide cured, man-made rubber containing a minimum 20% EPDM, with a specific gravity of 1.5 +/-0.1, cryogenically processed and chopped to two different gradations, 0.019 to 0.059 and 0.029 to 0.118 inches. The EPDM rubber will be the same color as chosen by the government for the track surface.

2.5 IMPERMEABLE LAYER

The resin for this application shall be a pigmented, thixotropic, two-component, polyol and isocyanate, moisture cured, urethane compound and shall be squeegee applied.

2.6 STRUCTURAL SPRAY COATING

The spray coating shall be a single component moisture cured, pigmented polyurethane, specifically formulated for compatibility with EPDM granules. The coating shall be the color red.

2.7 LINE MARKING PAINT (NOT USED)

PART 3 EXECUTION

3.1 ASPHALTIC SURFACE INSPECTION

Prior to the application of the synthetic track surface, the asphaltic concrete base shall be inspected for conformity to planarity requirements. The surface shall not deviate from the specified grade more than 1.26 inches in 10 feet measured in any direction. All areas not in conformance with the above requirements will be repaired by others, with materials as approved by the manufacturer and allowed to cure prior to application of synthetic course. The surface shall be constructed with a slope of 2.36 inches per 10 feet towards the inner edge.

3.2 CURING

The asphalt surface shall be cured for a minimum of 14 days before construction of the synthetic surface begins.

3.3 CLEANING

The area to be surfaced shall be clean and free of any loose particle or foreign substances (dirt, oil, etc.) prior to commencement of the work.

3.4 PRIMING

The primer shall be spray-applied in accordance with the manufacturer's specifications. Primer shall be applied within 12 hours of synthetic material installation.

3.5 BASE MAT

3.5.1 Mixing

SBR granules and binder shall be mixed according to manufacturer's instructions. Mixing time shall be 2 to 4 minutes.

3.5.2 Application

The material shall be spread onto the asphalt mat using a mechanical tandem leveler. The tandem leveler shall have a heated oscillating screed bar for smoothness and compaction. The heated screed shall be heated to between 158 and 176 degrees F.

The laying procedure shall be bay-to-bay and limiting the length of the passes so as not to have any cold (or cured) lints between the bays. At the beginning of each work day, the traverse joint from the previous day shall be tack coated to ensure adequate bond. Small irregularities remaining in the surface after the tandem leveler has passed shall be removed using a length polyethylene or a Teflon roller.

3.6 IMPERMEABLE LAYER

The components are mixed at the prescribed ration homogeneously with suitable mixing device. This may be a strong drilling machine with a mixing paddle, a static mixing machine, or an automatic mixer. Mixing shall be done for 2 to 4 minutes per batch, depending on the mixer used. The coating shall be squeegee-applied to the base mat, making it impermeable.

3.7 STRUCTURAL SPRAY WEAR COATS

The top layer installation shall commence after the black rubber and sealer coat have cured. The top layer shall consist of a spray coating and EPDM granules. The base mat shall be dry, clean, and free of dust, oils, and greases. The spray coating material shall be mixed with the EPDM granules in a suitable device. Application of the mixture shall include the use of a structure-spray-machine. The mixture shall be placed using two applications in alternate directions with approximately 0.14 pounds per square foot per coat.

3.8 LINE MARKINGS (NOT USED)

3.9 PHYSICAL REQUIREMENTS

The completed surface shall meet the following requirements:

Thickness: 0.512 inches or as specified in the drawings.

Shore A Hardness	ASTM D 2240	55 +/-5
Elongation at Break	ASTM D 412	110%
Tensile Strength	ASTM D 412	645 pounds/sq in (at 68 degrees F)
Compression Set Recovery	ASTM D 395	90-95% over 24 hour period (at 68 degrees F)
Abrasion Resistance	ASTM D 501	0.009 ounces loss after 100 cycles
Chalking	ASTM D 822	No change after 1000 hours

Coefficient of Friction	ASTM D 1984	Dry: 0.70 to 0.75 Wet: 0.60 to 0.65
Resilience	ASTM D 2632	38 to 42%
Tear Resistance	ASTM D 624	60-75 psi

3.10 CONTRACTOR QUALIFICATIONS

The contractor shall submit evidence of at least 20 surface installations in the last 3 years utilizing the type of system specified herein.

The surfacing contractor chosen shall show proof of manufacturing their own polyurethane coatings.

-- End of Section --

APPENDIX B

Climbing Bars



Figure B-1.

Climbing Bars Specifications

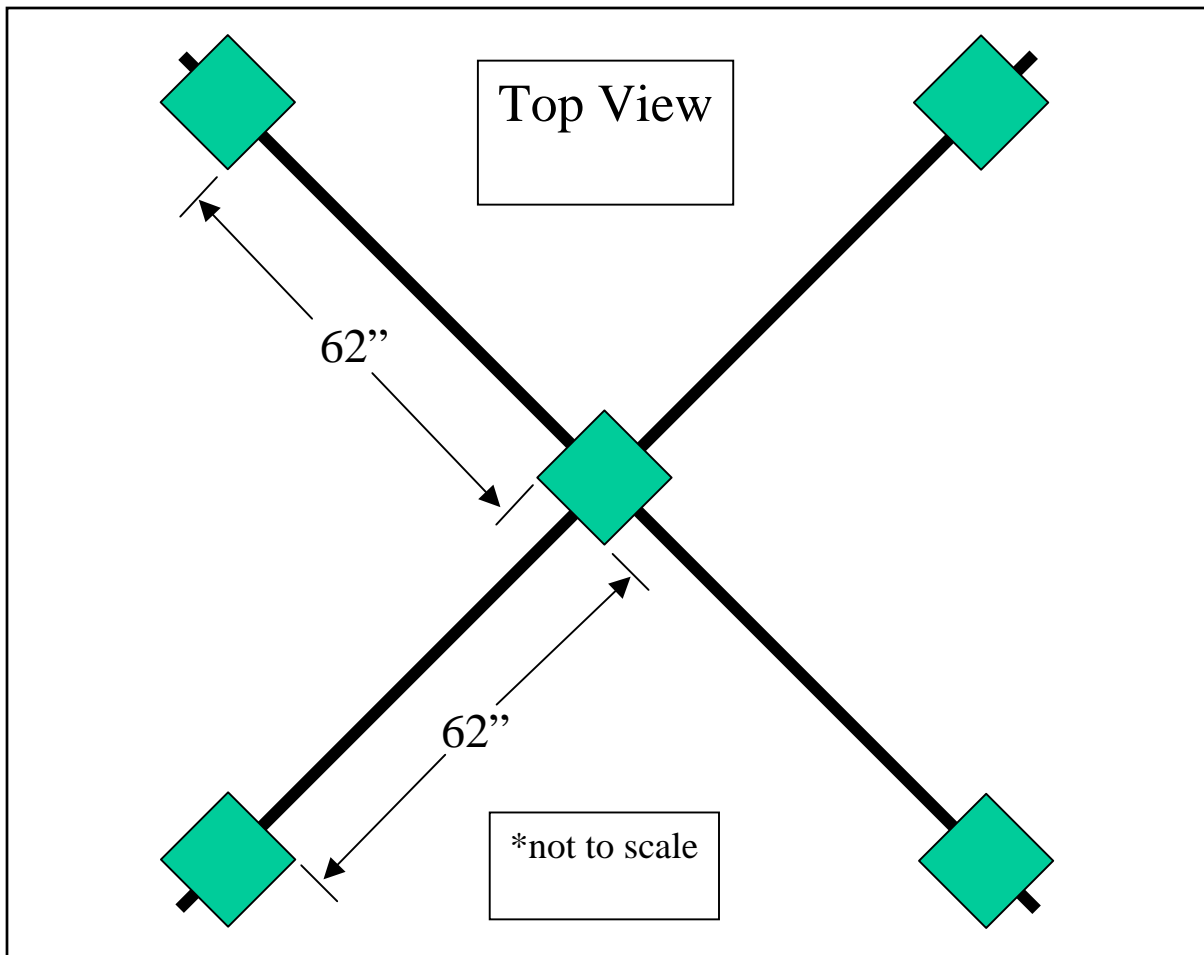


Figure B-2.

The specifications for the climbing bars are as follows:

- ❑ The posts (5) are 6" x 6" x 12' and sunk 3 feet into the ground, anchored with concrete.
- ❑ The bars (2) are threaded water pipe, 1.0 inch inside diameter, 12 feet long with 1-inch end caps (4).
- ❑ The bars are through the 6x6s at 7.5 and 8 feet above the ground.
- ❑ The distance from inside post edge to inside post edge is approximately 62 inches (refer to Figure B-2). This is to allow enough bar space to conduct all exercises safely.
- ❑ The step-ups (16 inches long) are cut from 4" x 4" x 8' posts and secured to the 6x6s with 3 inch screws that are counter sunk.
- ❑ The step-ups on the outside 6x6 posts are 18 inches from the ground, the step-ups on the inside post are 24 inches above the ground (refer to Figure DB-3).

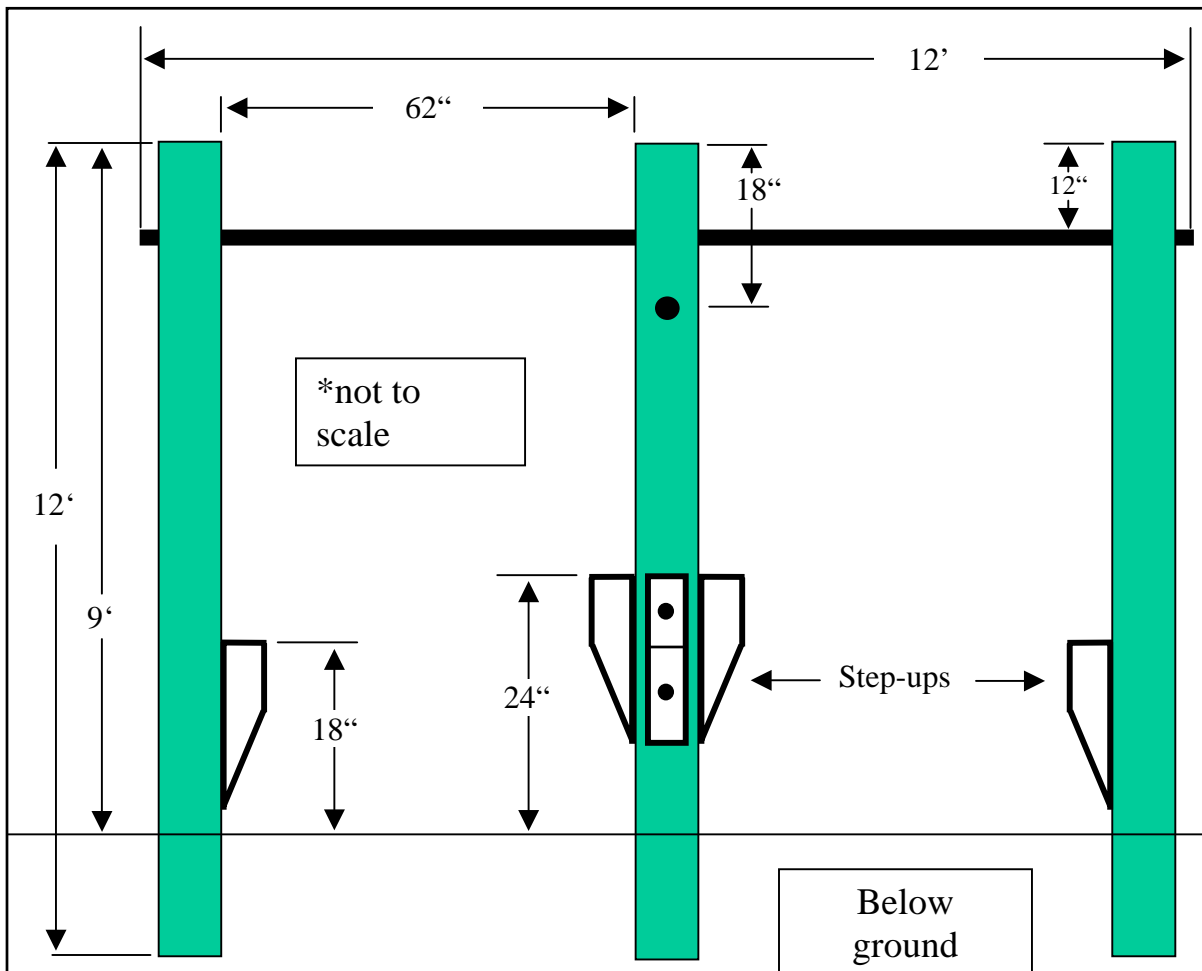


Figure B-3.

The following planning considerations apply:

- ❑ Climbing bars provide adequate space and facilitate better command and control than traditional pull-up bars. Traditional pull-up bars are too narrow to safely and efficiently conduct the climbing drills.
- ❑ Employment of multiple climbing bar “pods” as shown in Figure B-4 will allow for efficient mass training. The climbing drills require one bar for every three soldiers when performed as a single activity.
- ❑ The total ground surface area for four pods is only 625 square feet.
- ❑ Four pods will accommodate 16 stations x 3 soldiers per station for a total of 48 soldiers.
- ❑ Additional free-standing pods should be constructed to accommodate more soldiers.

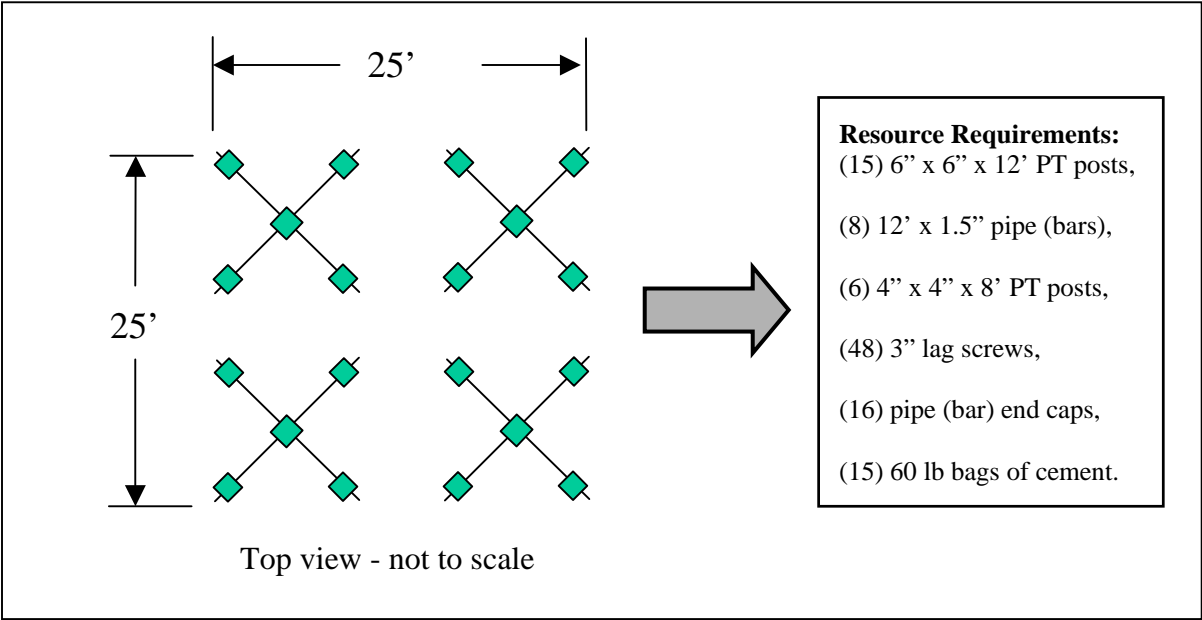


FIGURE B-4.

4.0 APPLICABLE CRITERIA

Unless a specific document version or date is indicated, use criteria from the most current references as of the date of issue of the contract or task order, including any applicable addenda, unless otherwise stated in the task order. In the event of conflict between References and/or Applicable Military Criteria, apply the most stringent requirement, unless otherwise specifically noted in the contract or task order.

4.1. INDUSTRY CRITERIA

Applicable design and construction criteria references are listed in Table 1 below. This list is not intended to include all criteria that may apply or to restrict design and construction to only those references listed. See also Paragraph 3 for additional facility-specific applicable criteria.

Table 1: Industry Criteria

Air Conditioning and Refrigeration Institute (ARI)	
ARI 310/380	Packaged Terminal Air-Conditioners and Heat Pumps
ARI 440	Room Fan-Coil and Unit Ventilator
ANSI/ARI 430-99	Central Station Air Handling Units
ARI 445	Room Air-Induction Units
ARI 880	Air Terminals
Air Movement and Control Association (AMCA)	
AMCA 210	Laboratory Methods of Testing Fans for Rating
American Architectural Manufacturers Association (AAMA)	
AAMA 605	Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
AAMA 607.1	Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
AAMA 1503	Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
American Association of State Highway and Transportation Officials (AASHTO)	
	Roadside Design Guide [guardrails, roadside safety devices]
	Standard Specifications for Transportation Materials and Methods of Sampling and Testing [Road Construction Materials]

	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
	Guide for Design of Pavement Structures, Volumes 1 and 2 [pavement design guide]
	A Policy of Geometric Design of Highways and Streets
American Bearing Manufacturers Association (AFBMA)	
AFBMA Std. 9	Load Ratings and Fatigue Life for Ball Bearings
AFBMA Std. 11	Load Ratings and Fatigue Life for Roller Bearings
American Boiler Manufacturers Association (ABMA)	
ABMA ISEI	Industry Standards and Engineering Information
American Concrete Institute	
ACI 302.2R	Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
ACI 318	Building Code Requirements for Structural Concrete
ACI SP-66	ACI Detailing Manual
ACI 530	Building Code Requirements for Masonry Structures
ADA Standards for Accessible Design	
See US Access Board	ADA and ABA Accessibility Guidelines for Buildings and Facilities, Chapters 3-10.
American Institute of Steel Construction (AISC)	
	Manual of Steel Construction – 13 th Edition (or latest version)
American Iron and Steel Institute	
AISI S100	North American Specification for the Design of Cold-Formed Steel Structural Members
American National Standards Institute 11 (ANSI)	

ANSI Z21.10.1	Gas Water Heaters Vol. 1, Storage water Heaters with Input Ratings of 75,000 Btu per Hour or less
ANSI Z124.3	American National Standard for Plastic Lavatories
ANSI Z124.6	Plastic Sinks
ANSI Z21.45	Flexible Connectors of Other Than All-Metal Construction for Gas Appliances
ANSI/IEEE C2-2007	National Electrical Safety Code
ANSI/AF&PA NDS-2001	National Design Specification for Wood Construction
American Society of Civil Engineers (ASCE)	
ASCE 7	Minimum Design Loads for Buildings and Other Structures
ASCE 37	Design and Construction of Sanitary and Storm Sewers, Manuals and Reports on Engineering Practice [sanitary sewer and storm drain design criteria]
ASCE/SEI 31-03	Seismic Evaluation of Existing Buildings [Existing Building Alteration/Renovation]
ASCE/SEI 41-06	Seismic Rehabilitation of Existing Buildings [Existing Building Alteration/Renovation]
American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)	
ASHRAE 90.1	ANSI/ASHRAE/IESNA 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE Guideline 0	The Commissioning Process
ASHRAE Guideline 1.1	The HVAC Commissioning Process
ASHRAE Handbooks	Fundamentals, HVAC Applications, Systems and Equipment, Refrigeration (Applicable, except as otherwise specified)
ASHRAE Standard 15	Safety Standard for Refrigeration Systems
ASHRAE Standard 62.1	Ventilation for Acceptable Indoor Air Quality
American Society of Mechanical Engineers International (ASME)	

ASME BPVC SEC VII	Boiler and Pressure Vessel Code: Section VII Recommended Guidelines for the Care of Power Boilers
ASME A17.1	Safety Code for Elevators and Escalators
ASME B 31 (Series)	Piping Codes
American Water Works Association (AWWA)	
	Standards [standards for water line materials and construction]
American Welding Society	
	Welding Handbook
	Welding Codes and Specifications (as applicable to application, see International Building Code for example)
Architectural Woodwork Institute (AWI)	
Version 1.2	AWI Quality Standards 7th Edition
Associated Air Balance Council (AABC)	
AABC MN-1	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems
	AABC Associated Air Balance Council Testing and Balance Procedures
ASTM International	
ASTM C1060-90(1997)	Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
ASTM E 779 (2003)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E1827-96(2002)	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
Builders Hardware Manufacturers Association (BHMA)	
ANSI/BHMA	American National Standards for Builders Hardware
Building Industry Consulting Service International	

	Telecommunications Distribution Methods Manual (TDMM)
	Customer-Owned Outside Plant Design Manual (CO-OSP)
Code of Federal Regulations (CFR)	
49 CFR 192	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
10 CFR 430	Energy Conservation Program for Consumer Products
Consumer Electronics Association	
CEA 709.1B	Control Network Protocol Specification
CEA 709.3	Free-Topology Twisted-Pair Channel Specification
CEA 852	Tunneling Component Network Protocols Over Internet Protocol Channels
Electronic Industries Association (EIA)	
ANSI/EIA/TIA 568	Structured Cabling Series
ANSI/EIA/TIA 569	Commercial Building Standard for Telecommunications Pathways and Spaces (includes ADDENDA)
ANSI/TIA/EIA-606	Administrative Standard for the Telecommunications Infrastructure of Commercial Buildings
J-STD EIA/TIA 607	Commercial Building Grounding and Bonding Requirements for Telecommunications
Federal Highway Administration (FHWA)	
	Manual on Uniform Traffic Control Devices for Streets and Highways [signage and pavement markings for streets and highways]
FHWA-NHI-01-021	Hydraulic Engineering Circular No. 22, Second Edition, URBAN DRAINAGE DESIGN MANUAL
Illuminating Engineering Society of North America (IESNA)	
IESNA RP-1	Office Lighting
IESNA RP-8	Roadway Lighting

IESNA Lighting Handbook	Reference and Application
Institute of Electrical and Electronics Engineers Inc. (IEEE)	
	Standard for Use of the International System of Units (SI): the Modern Metric System
Standard 1100	Recommended Practice for Powering and Grounding Sensitive Electronic Equipment
International Code Council (ICC)	
IBC	<p>International Building Code</p> <p>Note: All references in the International Building Code to the International Electrical Code shall be considered to be references to NFPA 70.</p> <p>All references in the International Building Code to the International Fuel Gas Code shall be considered to be references to NFPA 54 and NFPA 58.</p> <p>All references in the International Building Code to the International Fire Code and Chapter 9 shall be considered to be references to Unified Facilities Criteria (UFC) 3-600-01.</p>
IMC	<p>International Mechanical Code –</p> <p>Note: For all references to “HEATING AND COOLING LOAD CALCULATIONS”, follow ASHRAE 90.1</p> <p>Note: For all references to “VENTILATION”, follow ASHRAE 62.1</p>
IRC	International Residential Code
IPC	International Plumbing Code
IEC	Energy Conservation Code (IEC) –Applicable only to the extent specifically referenced herein. Refer to Paragraph 5, ENERGY CONSERVATION requirements.
IGC	International Gas Code - not applicable. Follow NFPA 54, National Fuel Gas Code and NFPA 58, Liquefied Petroleum Gas Code.
International Organization for Standardization (ISO)	
ISO 6781:1983	Qualitative detection of thermal irregularities in building envelopes – infrared method

LonMark International (LonMark)	
LonMark Interoperability Guidelines	(available at www.lonmark.org), including: Application Layer Guidelines, Layer 1-6 Guidelines, and External Interface File (XIF) Reference Guide
LonMark Resource Files	(available at www.lonmark.org), including Standard Network Variable Type (SNVT) definitions
Metal Building Manufacturers Association (MBMA)	
	Metal Building Systems Manual
Midwest Insulation Contractors Association (MICA)	
	National Commercial and Industrial Insulation Standards Manual
National Association of Corrosion Engineers International (NACE)	
NACE RP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0185	Extruded, Polyolefin Resin Coating Systems with Adhesives for Underground or Submerged Pipe
NACE RP0285	Corrosion Control of Underground Storage Tank Systems by Cathodic Protection
NACE RP0286	Electrical Isolation of Cathodically Protected Pipelines
National Electrical Manufacturers Association (NEMA)	
National Environmental Balancing Bureau (NEBB)	
	Procedural Standards Procedural Standards for Testing Adjusting Balancing of Environmental Systems
National Fire Protection Association (NFPA)	
NFPA 10	Standard for Portable Fire Extinguishers
NFPA 13	Installation of Sprinkler Systems
NFPA 13R	Residential Occupancies up to and Including Four Stories in Height Sprinkler Systems
NFPA 14	Standard for the Installation of Standpipes and Hose Systems

NFPA 20	Installation of Centrifugal Fire Pumps
NFPA 24 NFPA 25	Standard for the Installation of Private Fire Service Mains and Their Appurtenances [underground fire protection system design] Inspection, Testing And Maintenance Of Water-Based Fire Protection Systems
NFPA 30	Flammable and Combustible Liquids Code
NFPA 30A	Motor Fuel Dispensing Facilities and Repair Garages
NFPA 31	Installation of Oil Burning Equipment
NFPA 54	National Fuel Gas Code
NFPA 58	Liquefied Petroleum Gas Code
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 76	Fire Protection of Telecommunications Facilities
NFPA 80	Standard for Fire Doors and Fire Windows
NFPA 90a	Installation of Air Conditioning and Ventilating Systems
NFPA 96	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
NFPA 101	Life Safety Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
National Roofing Contractor's Association (NRCA)	
	Roofing and Waterproofing Manual
National Sanitation Foundation, International	
NSF/ANSI Std. 2, 3, 4, 5, 6, 7, 8, 12, 13, 18, 20, 21, 25, 29, 35, 36, 37, 51, 52, 59, 169	Food Equipment Standards

ANSI/UL Std. 73, 197, 471, 621, 763	Food Equipment Standards
CSA Std. C22.2 No. 109, 120, 195	Food Equipment Standards
Occupational Safety and Health Administration (OSHA)	
Title 29, Part 1926	OSHA Construction Industry Standards, Title 29, Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction
Plumbing and Drainage Institute (PDI)	
PDI G 101	Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data
PDI WH201	Water Hammer Arrestors
Precast Concrete Institute	
PCI Design Handbook	Precast and Prestressed Concrete
Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)	
SMACNA HVAC Duct Construction Standards	HVAC Duct Construction Standards - Metal and Flexible
SMACNA Architectural Manual	Architectural Sheet Metal Manual
SMACNA HVAC TAB	HVAC Systems - Testing, Adjusting and Balancing
State/Local Regulations	
	State Department of Transportation Standard Specifications for Highway and Bridge Construction
	Sedimentation and Erosion Control Design Requirements
	Environmental Control Requirements
	Storm Water Management Requirements
Steel Door Institute (SDI)	
ANSI A250.8/SDI 100	Standard Steel Doors and Frames

Steel Deck Institute	
	SDI Diaphragm Design Manual
Steel Joist Institute	
	Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders
Underwriters Laboratories (UL)	
UL 96A	Installation Requirements for Lightning Protection Systems
UL 300	Standard for Safety for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas
UNITED STATES ACCESS BOARD: U.S. ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD	
ADA and ABA Accessibility Guidelines for Buildings and Facilities	<p>ABA Accessibility Standard for DoD Facilities</p> <p>Derived from the ADA and ABA Accessibility Guidelines: Specifically includes: ABA Chapters 1 and 2 and Chapters 3 through 10.</p> <p>Use this reference in lieu of IBC Chapter 11.</p> <p>Excluded are:</p> <p>(a) Facilities, or portions of facilities, on a military installation that are designed and constructed for use exclusively by able-bodied military personnel (See Paragraph 3 for any reference to this exclusion).</p> <p>(b) Reserve and National Guard facilities, or portions of such facilities, owned by or under the control of the Department of Defense, that are designed and constructed for use exclusively by able-bodied military personnel. (See paragraph 3 for any reference to this exclusion).</p>
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES	
	FDA National Food Code
U.S. GREEN BUILDING COUNCIL (USGBC)	
LEED-NC	Green Building Rating System for New Construction & Major Renovations
	Application Guide for Multiple Buildings and On-Campus Building Projects

4.2. MILITARY CRITERIA

The project shall conform to the following criteria. Certain design impacts and features due to these criteria are noted for the benefit of the offeror. However, all requirements of the referenced criteria will be applicable, whether noted or not, unless otherwise specified herein.

4.2.1. Energy Policy Act of 2005 (Public Law 109-58) (applies only to the extent specifically implemented in the contract, which may or may not directly cite or reference EPACT)

4.2.2. Executive Order 12770: Metric Usage In Federal Government

(a) Metric design and construction is required except when it increases construction cost. Offeror to determine most cost efficient system of measurement to be used for the project.

4.2.3. TB MED 530: Occupational and Environmental Health Food Sanitation

4.2.4. Unified Facilities Criteria (UFC) 3-410-01FA: Heating, Ventilating, and Air Conditioning - applicable only to the extent specified in paragraph 5, herein.

4.2.5. Deleted.

4.2.6. UFC 3-600-01 Design: Fire Protection Engineering for Facilities. Use the latest edition of the IBC in coordination with this UFC. Use Chapters 3, 6, 7, 33 and UFC 3-600-01. If any conflict occurs between these Chapters and UFC 3-600-01, the requirements of UFC 3-600-01 take precedence. Use UFC 3-600-01 in lieu of IBC Chapters 4, 8,9,10.

4.2.7. UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings

4.2.8. UFC 4-023-03 Design of Buildings to Resist Progressive Collapse (Use most recent version, regardless of references thereto in other publications)

(a) Note the option to use tie force method or alternate path design for Occupancy Category II.

4.2.9. UFC 4-021-01 Design and O&M: Mass Notification Systems

4.2.10. Technical Criteria for Installation Information Infrastructure Architecture (I3A)

(a) Email: DetrickISECI3Aguide@conus.army.mil

4.2.11. U.S. Army Information Systems Engineering Command (USAISEC) TG for the Integration of SECRET Internet Protocol (IP) Router Network (SIPRNET). See Paragraph 3 for applicability to specific facility type. May not apply to every facility. This is mandatory criteria for those facilities with SIPRNET.

5.0 GENERAL TECHNICAL REQUIREMENTS

This paragraph contains general technical requirements. See also Paragraph 3 for facility-specific technical requirements. Residential or similar grade finishes and materials are not acceptable for inclusion in these buildings, unless otherwise specifically allowed.

5.1. SITE PLANNING AND DESIGN

5.1.1. STANDARDS AND CODES: The site planning and design shall conform to APPLICABLE CRITERIA and to paragraph 6, PROJECT SPECIFIC REQUIREMENTS.

5.1.2. SITE PLANNING OBJECTIVES: Group buildings in configurations that create a sense of community and promote pedestrian use. See paragraph 3 for additional site planning requirements relating to building functions.

5.1.2.1. Provide enclosures and or visual screening devices for Outdoor Utility such as dumpsters, emergency generators, transformers, heating, ventilation, and air conditioning units from streetscape and courtyard views to limit visual impact. Enclosures shall be compatible with the building they serve and accessible by vehicle. The location of dumpsters can have a significant visual impact and should be addressed as part of an overall building design and incorporated in site planning.

5.1.2.2. Where included in the project, dumpster pads shall be concrete (minimum of 8 inches thick on 4 inch base course, unless site conditions dictate more conservative requirements) and directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Provide space at dumpster areas for recycling receptacles. Coordinate with Installation on recycling receptacle types, sizes and access requirements and provide space at dumpster areas to accommodate them.

5.1.2.3. Vehicular Circulation. Apply design vehicle templates provided by the American Association of State Highway and Transportation Officials (AASHTO) to the site design. The passenger car class includes passenger cars and light trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational – privately owned vehicle (POV). The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semi-trailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Provide vehicle clearances required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Provide required traffic control signage Site entrances and site drive aisles shall maximize spacing between drives, incorporate right-angle turns, and limit points of conflict between traffic. Design Services Drives to restrict access to unauthorized vehicles by removable bollards, gates, or other barriers to meet Anti-Terrorism/Force Protection (ATFP) requirements. Orient service drives to building entrances other than the primary pedestrian entry at the front of the building.

5.1.2.4. Provide Emergency Vehicle Access around the facility and shall be in accordance with AT/FP requirements. Maintain a 33-foot clear zone buffer for emergency vehicles, designed to prevent other vehicles from entering the AT/FP standoff to the building.

5.1.2.5. Clear and grub all trees and vegetation necessary for construction; but, save as many trees as possible. Protect trees to be saved during the construction process from equipment.

5.1.2.6. Stormwater Management. Employ design and construction strategies (Best Management Practices) that reduce stormwater runoff, reduce discharges of polluted water offsite and maintain or restore predevelopment hydrology with respect to temperature, rate, volume and duration of flow to the maximum extent practicable. See paragraph 6, PROJECT SPECIFIC requirements for additional information.

5.1.3. EXTERIOR SIGNAGE: Provide exterior signage in accordance with Appendix H, Exterior Signage. Provide exterior NO SMOKING signage that conveys building and grounds smoking policy.

5.1.4. EXISTING UTILITIES: Base utilities maps and capacities for this site are included as part of this RFP. See paragraph 6 for more detailed information.

5.2. SITE ENGINEERING

5.2.1. STANDARDS AND CODES: The site engineering shall conform to APPLICABLE CRITERIA.

5.2.2. SOILS:

5.2.2.1. A report has been prepared to characterize the subsurface conditions at the project site and is **appended to these specifications**. The report provides a general overview of the soil and geologic conditions with detailed descriptions at discrete boring locations. The Contractor's team shall include a licensed geotechnical engineer to interpret the report and develop earthwork and foundation recommendations and design parameters in which to base the contractor's design. If any additional subsurface investigation or laboratory analysis is required to better characterize the site or develop the final design, the Contractor shall perform it under the direction of a licensed geotechnical engineer. There will be no separate payment for the cost of additional tests. If differences between the Contractor's additional subsurface investigation and the government provided soils report or the reasonably expected conditions require material revisions in the design, an equitable adjustment may be made, in accordance with the provisions of the Differing Site Conditions clause. The basis for the adjustment would be the design and construction appropriate for the conditions described in the Government furnished report or the reasonably expected conditions, in comparison with any changes required by material differences in the actual conditions encountered, in accordance with the terms of contract clause Differing Site Conditions.

5.2.2.2. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal, as described in Section 01 33 16, *Design After Award*.

5.2.3. VEHICLE PAVEMENTS: (as applicable to the project)

5.2.3.1. Design procedures and materials shall conform to one of the following: 1) the USACE Pavement Transportation Computer Assisted Structural Engineering (PCASE) program, 2) American Association of State Highway and Transportation Officials (AASHTO) or, 3) the applicable state Department of Transportation standards in which the project is located. See paragraph 5.2.2.2 and Section 01 33 16 for required information for the Contractor's geotechnical evaluation report. The minimum flexible pavement section shall consist of 2 inches of asphalt and 6 inches of base or as required by the pavement design, whichever is greater, unless specifically identified by the Government to be a gravel road. Design roads and parking areas for a life expectancy of 25 years with normal maintenance. Parking area for tactical vehicles (as applicable to the project) shall be Portland Cement Concrete (PCC) rigid pavement design. For concrete pavements, submit joint layout plan for review and concurrence. Design pavements for military tracked vehicles (as applicable to the project) IAW USACE PCASE. Traffic estimates for each roadway area will be as shown on the drawings or listed in Section 01 10 00 Paragraph 6.4.4. Pavement markings and traffic signage shall comply with the Installation requirements and with the Manual on Uniform Traffic Control Devices.

5.2.3.2. Parking Requirements.

(a) All handicap POV parking lots (where applicable in the facility specific requirements) shall meet the ADA and ABA Accessibility Guidelines for accessible parking spaces.

(b) Design POV parking spaces for the type of vehicles anticipated, but shall be a minimum of 9 ft by 18 ft for POVs, except for two wheel vehicles.

5.2.3.3. Sidewalks. Design the network of walks throughout the complex (where applicable) to facilitate pedestrian traffic among facilities, and minimize the need to use vehicles. Incorporate sidewalks to enhance the appearance of the site development, while creating a sense of entry at the primary patron entrances to the buildings. Minimum sidewalk requirements are in Paragraph 3, where applicable.

5.2.4. CATHODIC PROTECTION: Provide cathodic protection systems for all underground metallic systems and metallic fittings/portions of non-metallic, underground systems, both inside and outside the building 5 foot line that are subject to corrosion. Coordinate final solutions with the installation to insure an approach that is consistent with installation cathodic protection programs.

5.2.5. UTILITIES: See paragraph 6.4.6 for specific information on ownership of utilities and utility requirements. Meter all utilities (gas, water, and electric, as applicable) to each facility. For Government owned utilities, install meters that are wireless data transmission capable as well as have a continuous manual reading option. All meters will be capable of at least hourly data logging and transmission and provide consumption data for gas, water, and electricity. Gas and electric meters will also provide demand readings based on consumption over a maximum of

any 15 minute period. Configure all meters to transmit at least daily even if no receiver for the data is currently available at the time of project acceptance. For privatized utilities, coordinate with the privatization utility(ies) for the proper meter base and meter installation.

5.2.6. PERMITS: The CONTRACTOR shall be responsible for obtaining all permits (local, state and federal) required for design and construction of all site features and utilities.

5.2.7. IRRIGATION. Landscape irrigation systems, if provided, shall comply with the following:

5.2.7.1. Irrigation Potable Water Use Reduction. Reduce irrigation potable water use 50 percent using LEED credit WE1.1 baseline, except where precluded by other project requirements.

5.2.8. EPA WaterSense Products and Contractors. Except where precluded by other project requirements, use EPA WaterSense labeled products and irrigation contractors that are certified through a WaterSense labeled program where available.

5.3. ARCHITECTURE AND INTERIOR DESIGN:

This element will be evaluated per APPLICABLE CRITERIA under the quality focus.

5.3.1. STANDARDS AND CODES: The architecture and interior design shall conform to APPLICABLE CRITERIA.

5.3.2. GENERAL: Overall architectural goal is to provide a functional, quality, visually appealing facility that is a source of pride for the installation and delivered within the available budget and schedule.

5.3.3. COMPUTATION OF AREAS: See APPENDIX Q for how to compute gross and net areas of the facility(ies).

5.3.4. BUILDING EXTERIOR: Design buildings to enhance or compliment the visual environment of the Installation. Where appropriate, reflect a human scale to the facility. Building entrance should be architecturally defined and easily seen. When practical, exterior materials, roof forms, and detailing shall be compatible with the surrounding development and adjacent buildings on the Installation and follow locally established architectural themes. Use durable materials that are easy to maintain. Exterior colors shall conform to the Installation requirements. See paragraph 6.

5.3.4.1. Building Numbers: Each building shall have exterior signage permanently attached on two faces of the building indicating the assigned building number or address. Building number signage details and locations shall conform to Appendix H, Exterior Signage.

5.3.5. BUILDING INTERIOR

5.3.5.1. Space Configuration: Arrange spaces in an efficient and functional manner in accordance with area adjacency matrices.

5.3.5.2. Surfaces: Appearance retention is the top priority for building and furniture related finishes. Provide low maintenance, easily cleaned room finishes that are commercially standard for the facility occupancy specified, unless noted otherwise.

5.3.5.3. Color: The color, texture and pattern selections for the finishes of the building shall provide an aesthetically pleasing, comfortable, easily maintainable and functional environment for the occupants. Coordination of the building colors and finishes is necessary for a cohesive design. Color selections shall be appropriate for the building type. The use of color, texture and pattern shall be used to path or way find through the building. Trendy colors that will become dated shall be limited to non-permanent finishes such as carpet and paint. Finishes should be selected with regards to aesthetics, maintenance, durability, life safety and image. Limit the number of similar colors for each material. Color of Ceramic and porcelain tile grout shall be medium range color to help hide soiling. Plastic laminate and solid surface materials shall have patterns that are mottled, flecked or speckled. Finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items shall be coordinated with the building interior. Color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) shall match the ceiling color.

5.3.5.4. Circulation: Circulation schemes must support easy way finding within the building.

5.3.5.5. Signage: Provide interior signage for overall way finding and life safety requirements. A comprehensive interior plan shall be from one manufacturer. Include the following sign types: (1) Lobby Directory, (2) Directional Signs; (3) Room Identification Signs; (4) Building Service Signs; (5) Regulatory Signs; (6) Official and Unofficial Signs (7) Visual Communication Boards (8) NO SMOKING signage that conveys building smoking policy. Use of emblems or logos may also be incorporated into the signage plan.

5.3.5.6. Window Treatment: Interior window treatments with adjustable control shall be provided in all exterior window locations for control of day light coming in windows or privacy at night. Uniformity of treatment color and material shall be maintained to the maximum extent possible within a building.

5.3.6. COMPREHENSIVE INTERIOR DESIGN

5.3.6.1. Comprehensive Interior Design includes the integration of a Structural Interior Design (SID) and a Furniture, Fixtures and Equipment (FF&E) design and package. SID requires the design, selection and coordination of interior finish materials that are integral to or attached to the building structure. Completion of a SID involves the selection and specification of applied finishes for the building's interior features including, but not limited to, walls, floors, ceilings, trims, doors, windows, window treatments, built-in furnishings and installed equipment, lighting, and signage. The SID package includes finish schedules, finish samples and any supporting interior elevations, details or plans necessary to communicate the building finish design and build out. The SID also provides basic space planning for the anticipated FF&E requirements in conjunction with the functional layout of the building and design issues such as life safety, privacy, acoustics, lighting, ventilation, and accessibility. See Section 01 33 16 for SID design procedures.

The FF&E design and package includes the design, selection, color coordination and of the required furnishing items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility coordinated with the interior finish materials in the SID. The FF&E package includes the specification, procurement documentation, placement plans, ordering and finish information on all freestanding furnishings and accessories, and a cost estimate. Coordinate the selection of furniture style, function and configuration with the defined requirements. Examples of FF&E items include, but are not limited to workstations, seating, files, tables, beds, wardrobes, draperies and accessories as well as marker boards, tack boards, and presentation screens. Criteria for furniture selection include function and ergonomics, maintenance, durability, sustainability, comfort and cost. See Section 01 33 16 for FFE design procedures.

5.4. STRUCTURAL DESIGN

5.4.1. STANDARDS AND CODES: The structural design shall conform to APPLICABLE CRITERIA.

5.4.2. GENERAL: The structural system needs to be compatible with the intended functions and components that allows for future flexibility and reconfigurations of the interior space. Select an economical structural system based upon facility size, projected load requirements and local availability of materials and labor. Base the structural design on accurate, site specific geotechnical information and anticipated loads for the building types and geographical location. When modular units or other pre-fabricated construction is used or combined with stick-built construction, fully coordinate and integrate the overall structural design between the two different or interfacing construction types. If the state that the project is located in requires separate, specific licensing for structural engineers (for instance, such as in Florida, California and others), then the structural engineer designer of record must be registered in that state.

5.4.3. LOADS: See paragraph 3 for facility specific (if applicable) and paragraph 6 for site and project specific structural loading criteria.

5.4.4. TERMITE TREATMENT: (Except Alaska) Provide termite prevention treatment in accordance with Installation and local building code requirements, using licensed chemicals and licensed applicator firm.

5.5. THERMAL PERFORMANCE

5.5.1. STANDARDS AND CODES: Building construction and thermal insulation for mechanical systems shall conform to APPLICABLE CRITERIA.

5.5.2. BUILDING ENVELOPE SEALING PERFORMANCE REQUIREMENT. Design and construct the building envelope for office buildings, office portions of mixed office and open space (e.g., company operations facilities), dining, barracks and instructional/training facilities with a continuous air barrier to control air leakage into, or out of, the conditioned space. Clearly identify all air barrier components of each envelope assembly on construction documents and detail the joints, interconnections and penetrations of the air barrier components. Clearly identify the boundary limits of the building air barriers, and of the zone or zones to be tested for building air tightness on the drawings.

5.5.2.1. Trace a continuous plane of air-tightness throughout the building envelope and make flexible and seal all moving joints.

5.5.2.2. The air barrier material(s) must have an air permeance not to exceed 0.004 cfm / sf at 0.3" wg (0.02 L/s.m2 @ 75 Pa) when tested in accordance with ASTM E 2178

5.5.2.3. Join and seal the air barrier material of each assembly in a flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of these assemblies and components.

5.5.2.4. Support the air barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement, or damage, and transfer the load to the structure.

5.5.2.5. Seal all penetrations of the air barrier. If any unavoidable penetrations of the air barrier by electrical boxes, plumbing fixture boxes, and other assemblies are not airtight, make them airtight by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly.

5.5.2.6. The air barrier must be durable to last the anticipated service life of the assembly.

5.5.2.7. Do not install lighting fixtures with ventilation holes through the air barrier

5.5.2.8. Provide a motorized damper in the closed position and connected to the fire alarm system to open on call and fail in the open position for any fixed open louvers such as at elevator shafts.

5.5.2.9. Damper and control to close all ventilation or make-up air intakes and exhausts, atrium smoke exhausts and intakes, etc when leakage can occur during inactive periods.

5.5.2.10. Compartmentalize garages under buildings by providing air-tight vestibules at building access points.

5.5.2.11. Compartmentalize spaces under negative pressure such as boiler rooms and provide make-up air for combustion.

5.5.2.12. Performance Criteria and Substantiation: Submit the qualifications and experience of the testing entity for approval. Demonstrate performance of the continuous air barrier for the opaque building envelope by the following tests:

(a) Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed 0.25cfm/ft2 at a pressure differential of 0.3" w.g.(75 Pa) in accordance with ASTM's E 779 (2003) or E-1827-96 (2002). Accomplish tests using either pressurization or depressurization or both. Divide the volume of air leakage in cfm @ 0.3" w.g. (L/s @ 75 Pa) by the area of the pressure boundary of the building, including roof or ceiling, walls and floor to produce the air leakage rate in cfm/ft2 @ 0.3" w.g. (L/s.m2 @ 75 Pa). Do not test the building until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.

(b) Test the completed building using Infrared Thermography testing. Use infrared cameras with a resolution of 0.1deg C or better. Perform testing on the building envelope in accordance with ISO 6781:1983 and ASTM C1060-90(1997). Determine air leakage pathways using ASTM E 1186-03 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems, and perform corrective work as necessary to achieve the whole building air leakage rate specified in (a) above.

(c) Notify the Government at least three working days prior to the tests to provide the Government the opportunity to witness the tests. Provide the Government written test results confirming the results of all tests.

5.6. PLUMBING

5.6.1. STANDARDS AND CODES: The plumbing system shall conform to APPLICABLE CRITERIA.

5.6.2. PRECAUTIONS FOR EXPANSIVE SOILS: Where expansive soils are present, the design for underslab piping systems and underground piping serving chillers, cooling towers, etc, shall include features to control forces resulting from soil heave. Some possible solutions include, but are not necessarily limited to, features such as flexible expansion joints, slip joints, horizontal offsets with ball joints, or multiple bell and spigot gasketed fittings. For structurally supported slabs, piping should be suspended from the structure with adequate space provided below the pipe for the anticipated soil movement.

5.6.3. HOT WATER SYSTEMS: For Hot Water heating and supply, provide a minimum temp of 140 Deg F in the storage tank and a maximum of 110 Deg F at the fixture, unless specific appliances or equipment specifically require higher temperature water supply.

5.6.4. SIZING HOT WATER SYSTEMS: Unless otherwise specified or directed in paragraph 3, design in accordance with ASHRAE Handbook Series (appropriate Chapters), ASHRAE Standard 90.1, and the energy conservation requirements of the contract. Size and place equipment so that it is easily accessible and removable for repair or replacement.

5.6.5. JANITOR CLOSETS: In janitor spaces/room/closets, provide at minimum, a service sink with heavy duty shelf and wall hung mop and broom rack(s).

5.6.6. FLOOR DRAINS: As a minimum, provide floor drains in mechanical rooms and areas, janitor spaces/rooms/closets and any other area that requires drainage from fixtures or equipment, drain downs, condensate, as necessary.

5.6.7. URINALS: Urinals shall be vitreous china, wall-mounted, wall outlet, non-water using, with integral drain line connection, and with sealed replaceable cartridge or integral liquid seal trap. Either type shall use a biodegradable liquid to provide the seal and maintain a sanitary and odor-free environment. Install, test and maintain in accordance with manufacturer's recommendations. Slope the sanitary sewer branch line for non-water use urinals a minimum of 1/4 inch per foot. Do not use copper tube or pipe for drain lines that connect to the urinal. Manufacturer shall provide an operating manual and on-site training to installation operations personnel for the proper care and maintenance of the urinal. For complexes, non-water using urinals are not required for barracks type spaces.

5.6.8. BUILDING WATER USE REDUCTION. Reduce building potable water use in each building 20 percent using IPC fixture performance requirements baseline except where precluded by other project requirements.

5.6.9. Do not use engineered vent or Sovent® type drainage systems.

5.6.10. Where the seasonal design temperature of the cold water entering a building is below the seasonal design dew point of the indoor ambient air, and where condensate drip will cause damage or create a hazard, insulate plumbing piping with a vapor barrier type of insulation to prevent condensation. Do not locate water or drainage piping over electrical wiring or equipment unless adequate protection against water (including condensation) damage is provided. Insulation alone is not adequate protection against condensation. Follow ASHRAE Fundamentals Chapter 23, Insulation for Mechanical Systems, IMC paragraph 1107 and International Energy Conservation Code for pipe insulation requirements.

5.7. ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

5.7.1. STANDARDS AND CODES: The electrical systems for all facilities shall conform to APPLICABLE CRITERIA.

5.7.2. MATERIALS AND EQUIPMENT: Materials, equipment and devices shall, as a minimum, meet the requirements of Underwriters Laboratories (UL) where UL standards are established for those items. Wiring for branch circuits shall be copper. Motors larger than one-half horsepower shall be three phase. All electrical systems shall be pre-wired and fully operational unless otherwise indicated. Wall mounted electrical devices (power

receptacles, communication outlets and CATV outlets) shall have matching colors, mounting heights and faceplates.

5.7.3. POWER SERVICE: Primary service from the base electrical distribution system to the pad-mounted transformer and secondary service from the transformer to the building service electrical equipment room shall be underground. See paragraph 6 for additional site electrical requirements.

5.7.3.1. Spare Capacity: Provide 10% space for future circuit breakers in all panelboards serving residential areas of buildings and 15% spaces in all other panelboards.

5.7.4. TELECOMMUNICATION SERVICE: The project's facilities must connect to the Installation telecommunications (voice and data) system through the outside plant (OSP) telecommunications underground infrastructure cabling system per the I3A Criteria. Connect to the OSP cabling system from each facility main cross connect located in the telecommunications room.

5.7.5. LIGHTING: Lighting shall comply with the recommendations of the Illumination Engineering Society of North America (IESNA).

5.7.5.1. Interior Lighting: Interior lighting shall utilize electronic ballast and energy efficient fluorescent lamps with a Correlated Color Temperature of 4100K. Compact fluorescent fixtures shall have a Color Rendering Index of (CRI) of 82 or higher. Linear fluorescent fixtures shall have a CRI of 85 or higher. Fluorescent lamps shall be the low mercury type qualifying as non-hazardous waste upon disposal. Surface mounted fixtures shall not be used on acoustical tile ceilings. An un-switched fixture with emergency ballast shall be provided at each entrance to the building.

5.7.6. TELECOMMUNICATION SYSTEM: All building telecommunications cabling systems (BCS) and OSP telecommunications cabling system shall conform to APPLICABLE CRITERIA to include I3A Technical Criteria. An acceptable BCS encompasses, but is not limited to, copper and fiber optic (FO) entrance cable, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, workstation outlets, racks, cable management, patch panels, cable tray, cable ladder, conduits, grounding, and labeling.. Items included under OSP infrastructure encompass, but are not limited to, manhole and duct infrastructure, copper cable, fiber optic cable, cross connects, terminations, cable vaults, and copper and FO entrance cable.

5.7.6.1. Design, install, label and test all telecommunications systems in accordance with the I3A Criteria and ANSI/TIA/EIA 568, 569, and 606 standards. A Building Industry Consulting Services International (BICSI) Registered Communications Distribution Designer (RCDD) with at least 2 yrs related experience shall develop and stamp telecommunications design, and prepare the test plan. See paragraph 5.8.2.5 for design of environmental systems for Telecommunications Rooms.

5.7.6.2. The installers assigned to the installation of the telecommunications system or any of its components shall be regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. Key personnel; i.e., supervisors and lead installers assigned to the installation of this system or any of its components shall be BICSI Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel. In lieu of BICSI certification, supervisors and installers shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.

5.7.6.3. Perform a comprehensive end to end test of all circuits to include all copper and fiber optic cables upon completion of the BCS and prior to acceptance of the facility. The BCS circuits include but are not limited to all copper and fiber optic(FO) entrance cables, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, and workstation outlets. Test in accordance with ANSI/EIA/TIA 568 standards. Use test instrumentation that meets or exceeds the standard. Submit the official test report to include test procedures, parameters tested, values, discrepancies and corrective actions in electronic format. Test and accomplish all necessary corrective actions to ensure that the government receives a fully operational, standards based, code compliant telecommunications system.

5.7.7. LIGHTNING PROTECTION SYSTEM: Provide a lightning protection system where recommended by the Lightning Risk Assessment of NFPA 780, Annex L.

5.8. HEATING, VENTILATING, AND AIR CONDITIONING

5.8.1. STANDARDS AND CODES: The HVAC system shall conform to APPLICABLE CRITERIA.

5.8.2. DESIGN CONDITIONS.

5.8.2.1. Outdoor and indoor design conditions shall be in accordance with UFC 3-410-01FA. Outdoor air and exhaust ventilation requirements for indoor air quality shall be in accordance with ASHRAE 62.1.

5.8.2.2. Design systems in geographical areas that meet the definition for high humidity in UFC 3-410-01FA in accordance with the special criteria for humid areas therein.

5.8.2.3. Cooling equipment may be oversized by up to 15 percent to account for recovery from night setback. Heating equipment may be oversized by up to 30 percent to account for recovery from night setback. Design single zone systems and multi-zone systems to maintain an indoor design condition of 50% relative humidity for cooling only. For heating only where the indoor relative humidity is expected to fall below 20% for extended periods, add humidification to increase the indoor relative humidity to 30%. Provide ventilation air from a separate dedicated air handling unit (DOAU) for facilities using multiple single zone fan-coil type HVAC systems. Do not condition outside air through fan coil units. Avoid the use of direct expansion cooling coils in air handling units with constant running fans that handle outside air.

5.8.2.4. Locate all equipment so that service, adjustment and replacement of controls or internal components are readily accessible for easy maintenance.

5.8.2.5. Environmental Requirements for Telecommunications Rooms,(including SIPRNET ROOMS, where applicable for specific facility type). Comply with ANSI/EIA/TIA 569 and the I3A.

5.8.2.6. Fire dampers: dynamic type with a dynamic rating suitable for the maximum air velocity and pressure differential to which the damper is subjected. Test each fire damper with the air handling and distribution system running.

5.8.3. BUILDING AUTOMATION SYSTEM. Provide a Building Automation System consisting of a building control network , and integrate the building control network into the UMCS as specified.

The building control network shall be a single complete non-proprietary Direct Digital Control (DDC) system for control of the heating, ventilating and air conditioning (HVAC) systems as specified herein. The building control network shall be an Open implementation of LONWORKS® technology using ANSI/EIA 709.1B as the only communications protocol and use only LonMark Standard Network Variable Types (SNVTs), as defined in the LonMark® Resource Files, for communication between DDC Hardware devices to allow multi-vendor interoperability.

5.8.3.1. The building automation system shall be open in that it is designed and installed such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without further dependence on the original Contractor. This includes, but is not limited to the following:

- (a) Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.
- (b) Necessary documentation (including rights to documentation and data), configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the Government such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor.

5.8.3.2. All DDC Hardware shall:

- (a) Be connected to a TP/FT-10 ANSI/EIA 709.3 control network.
- (b) Communicate over the control network via ANSI/EIA 709.1B exclusively.
- (c) Communicate with other DDC hardware using only SNVTs
- (d) Conform to the LonMark® Interoperability Guidelines.

- (e) Be locally powered; link power (over the control network) is not acceptable.
- (f) Be fully configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself to support the application. All settings and parameters used by the application shall be configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself
- (g) Provide input and output SNVTs required to support monitoring and control (including but not limited to scheduling, alarming, trending and overrides) of the application. Required SNVTs include but are not limited to: SNVT outputs for all hardware I/O, SNVT outputs for all setpoints and SNVT inputs for override of setpoints.
- (h) To the greatest extent practical, not rely on the control network to perform the application..

5.8.3.3. Controllers shall be Application Specific Controllers whenever an ASC suitable for the application exists. When an ASC suitable for the application does not exist use programmable controllers or multiple application specific controllers.

5.8.3.4. Application Specific Controllers shall be LonMark Certified whenever a LonMark Certified ASC suitable for the application exists. For example, VAV controllers must be LonMark certified.

5.8.3.5. Application Specific Controllers (ASCs) shall be configurable via an LNS plug-in whenever t an ASC with an LNS plug-in suitable for the application exists.

5.8.3.6. Each scheduled system shall accept a network variable of type SNVT_occupancy and shall use this network variable to determine the occupancy mode. If the system has not received a value to this network variable for more than 60 minutes it shall default to a configured occupancy schedule.

5.8.3.7. Gateways may be used provided that each gateway communicates with and performs protocol translation for control hardware controlling one and only one package unit.

5.8.3.8. Not Used

5.8.3.9. Perform all necessary actions needed to fully integrate the building control system. These actions include but are not limited to:

- Configure M&C Software functionality including: graphical pages for System Graphic Displays including overrides, alarm handling, scheduling, trends for critical values needing long-term or permanent monitoring via trends, and demand limiting.
- Install IP routers or ANSI/CEA-852 routers as needed to connect the building control network to the UMCS IP network. Routers shall be capable of configuration via DHCP and use of an ANSI/CEA-852 configuration server but shall not rely on these services for configuration. All communication between the UMCS and building networks shall be via the ANSI/CEA-709.1B protocol over the IP network in accordance with ANSI/CEA-852.

5.8.3.10. Provide the following to the Government for review prior to acceptance of the system:

- The latest version of all software and user manuals required to program, configure and operate the system.
- Points Schedule drawing that shows every DDC Hardware device. The Points Schedule shall contain the following information as a minimum:
 - Device address and NodeID.
 - Input and Output SNVTs including SNVT Name, Type and Description.
 - Hardware I/O, including Type (AI, AO, BI, BO) and Description.
 - Alarm information including alarm limits and SNVT information.
 - Supervisory control information including SNVTs for trending and overrides.
 - Configuration parameters (for devices without LNS plug-ins) Example Points Schedules are available at <https://eko.usace.army.mil/fa/besc/>
- Riser diagram of the network showing all network cabling and hardware. Label hardware with ANSI.CEA-709.1 addresses, IP addresses, and network names.
- Control System Schematic diagram and Sequence of Operation for each HVAC system.
- Operation and Maintenance Instructions including procedures for system start-up, operation and shut-down, a routine maintenance checklist, and a qualified service organization list.
- LONWORKS® Network Services (LNS®) database for the completed system.

- Quality Control (QC) checklist (below) completed by the Contractor's Chief Quality Control (QC) Representative

Table 5-1: QC Checklist

Instructions: Initial each item, sign and date verifying that the requirements have been met.		
#	Description	Initials
1	All DDC Hardware is installed on a TP/FT-10 local control bus.	
2	Communication between DDC Hardware is only via EIA 709.1B using SNVTs. Other protocols and network variables other than SNVTs have not been used.	
3	All sequences are performed using DDC Hardware.	
4	LNS Database is up-to-date and accurately represents the final installed system	
5	All software has been licensed to the Government	
6	M&C software monitoring displays have been created for all building systems, including all override and display points indicated on Points Schedule drawings.	
7	Final As-built Drawings accurately represent the final installed system.	
8	O&M Instructions have been completed and submitted.	
9	Connections between the UMCS IP network and ANSI/CEA-709.1B building networks are through ANSI/CEA-852 Routers.	
By signing below I verify that all requirements of the contract, including but not limited to the above, been met.		
Signature: _____ Date: _____		

5.8.3.11. Perform a Performance Verification Test (PVT) under Government supervision prior to system acceptance. During the PVT demonstrate that the system performs as specified, including but not limited to demonstrating that the system is Open and correctly performs the Sequences of Operation.

5.8.3.12. Provide a 1 year unconditional warranty on the installed system and on all service call work. The warranty shall include labor and material necessary to restore the equipment involved in the initial service call to a fully operable condition.

5.8.3.13. Provide training at the project site on the installed building system. Upon completion of this training each student, using appropriate documentation, should be able to start the system, operate the system, recover the system after a failure, perform routine maintenance and describe the specific hardware, architecture and operation of the system.

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5.8.4. TESTING, ADJUSTING AND BALANCING. Test and balance air and hydronic systems, using a firm certified for testing and balancing by the Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or the Testing Adjusting, and Balancing Bureau (TABB). The prime contractor shall hire the TAB firm directly, not through a subcontractor. Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, i.e., AABC MN-1, NEBB TABES, or SMACNA HVACTAB unless otherwise specified herein. All recommendations and suggested practices contained in the TAB Standard shall be considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practicable to satisfy the Contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB Firm and Specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations. All quality assurance provisions of the TAB Standard such as performance guarantees shall be part of this contract. For systems or system components not covered in the TAB Standard, the TAB Specialist shall develop TAB procedures. Where new procedures, requirements, etc., applicable to the Contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are mandatory.

5.8.5. COMMISSIONING: Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for LEED Fundamental commissioning, in accordance with ASHRAE Guideline 1.1, ASHRAE Guideline 0 and LEED. Do not use the sampling techniques discussed in ASHRAE Guideline 1.1 and in ASHRAE Guideline 0. Commission 100% of the HVAC controls and equipment. The Contractor shall hire the Commissioning Authority (CA), certified as a CA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CA will be an independent contractor and not an employee or subcontractor of the Contractor or any other subcontractor on this project, including the design professionals (i.e., the DOR or their firm(s)). The Contracting Officer's Representative will act as the Owner's representative in performance of duties spelled out under OWNER in Annex F of ASHRAE Guideline 0.

5.9. ENERGY CONSERVATION

5.9.1. The building including the building envelope, HVAC systems, service water heating, power, and lighting systems shall meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.2. Design all building systems and elements to meet the minimum requirements of ANSI/ASHRAE/IESNA 90.1. Design the buildings, including the building envelope, HVAC systems, service water heating, power, and lighting systems to achieve an energy consumption that is at least 30% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1. Energy calculation methodologies and substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.3. Purchase Energy Star or FEMP designated products. The term "Energy Star product" means a product that is rated for energy efficiency under an Energy Star program. The term "FEMP designated product" means a product that is designated under the Federal Energy Management Program of the Department of Energy as being among the highest 25 percent of equivalent products for energy efficiency. When selecting integral sized electric motors, choose NEMA PREMIUM type motors that conform to NEMA MG 1, minimum Class F insulation system. Motors with efficiencies lower than the NEMA PREMIUM standard may only be used in unique applications that require a high constant torque speed ratio (e.g., inverter duty or vector duty type motors that conform to NEMA MG 1, Part 30 or Part 31).

5.9.4. Solar Hot Water Heating. Provide at least 30% of the domestic hot water requirements through solar heating methodologies, unless the results of a Life Cycle Cost Analysis (LCCA) developed utilizing the Building Life Cycle Cost Program (BLCC) which demonstrates that the solar hot water system is not life cycle cost effective in comparison with other hot water heating systems. The type of system will be established during the contract or task order competition and award phase, including submission of an LCCA for government evaluation to justify non-selection of solar hot water heating. The LCCA uses a study period of 25 years and the Appendix K utility cost information. The LCCA shall include life cycle cost comparisons to a baseline system to provide domestic hot water without solar components, analyzing at least three different methodologies for providing solar hot water to compare against the baseline system.

5.9.5. Process Water Conservation. When potable water is used to improve a building's energy efficiency, employ lifecycle cost effective water conservation measures, except where precluded by other project requirements.

5.9.6. Renewable Energy Features. The Government's goal is to implement on-site renewable energy generation for Government use when lifecycle cost effective. See Paragraph 6, PROJECT SPECIFIC REQUIREMENTS for renewable energy requirements for this project.

5.10. FIRE PROTECTION

5.10.1. STANDARDS AND CODES Provide the fire protection system conforming to APPLICABLE CRITERIA.

5.10.2. Inspect and test all fire suppression equipment and systems, fire pumps, fire alarm and detection systems and mass notification systems in accordance with the applicable NFPA standards. The fire protection engineer of record shall witness final tests. The fire protection engineer of record shall certify that the equipment and systems are fully operational and meet the contract requirements. Two weeks prior to each final test, the contractor shall notify, in writing, the installation fire department and the installation public work representative of the test and invite them to witness the test.

5.10.3. Fire Extinguisher Cabinets: Provide fire extinguisher cabinets and locations for hanging portable fire extinguishers in accordance with NFPA 10 Standard for Portable Fire Extinguishers.

5.10.4. Fire alarm and detection system: Required fire alarm and detection systems shall be the addressable type. Fire alarm initiating devices, such as smoke detectors, heat detectors and manual pull stations shall be addressable. When the system is in alarm condition, the system shall annunciate the type and location of each alarm initiating device. Sprinkler water flow alarms shall be zoned by building and by floor. Supervisory alarm initiating devices, such as valve supervisory switches, fire pump running alarm, low-air pressure on dry sprinkler system, etc. shall be zoned by type and by room location.

5.10.5. Fire Protection Engineer Qualifications: In accordance with UFC 3-600-01, FIRE PROTECTION ENGINEERING FOR FACILITIES, the fire protection engineer of record shall be a registered professional engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES), or a registered P.E. in a related engineering discipline with a minimum of 5 years experience, dedicated to fire protection engineering that can be verified with documentation.

5.11. SUSTAINABLE DESIGN

5.11.1. STANDARDS AND CODES: Sustainable design shall conform to APPLICABLE CRITERIA. See paragraph 6, PROJECT-SPECIFIC REQUIREMENTS for which version of LEED applies to this project. The LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) applies to all projects. Averaging may be used for LEED compliance as permitted by the AGMBC but is restricted to only those buildings included in this project. Each building must individually comply with the requirements of paragraphs ENERGY CONSERVATION and BUILDING WATER USE REDUCTION.

5.11.2. LEED RATING, REGISTRATION, VALIDATION AND CERTIFICATION: See Paragraph PROJECT-SPECIFIC REQUIREMENTS for project minimum LEED rating/achievement level, for facilities that are exempt from the minimum LEED rating, for LEED registration and LEED certification requirements and for other project-specific information and requirements.

5.11.2.1. Innovation and Design Credits. LEED Innovation and Design (ID) credits are acceptable only if they are supported by formal written approval by GBCI (either published in USGBC Innovation and Design Credit Catalog or accompanied by a formal ruling from GBCI). LEED ID credits that require any Owner actions or commitments are acceptable only when Owner commitment is indicated in paragraph PROJECT-SPECIFIC REQUIREMENTS or Appendix LEED Project Credit Guidance

5.11.3. OPTIMIZE ENERGY PERFORMANCE. : Project must earn, as a minimum, the points associated with compliance with paragraph ENERGY CONSERVATION. LEED documentation differs from documentation requirements for paragraph ENERGY CONSERVATION and both must be provided. For LEED-NC v2.2 projects you may substitute ASHRAE 90.1 2007 Appendix G in its entirety for ASHRAE 90.1 2004 in accordance with USGBC Credit Interpretation Ruling dated 4/23/2008.

5.11.4. COMMISSIONING. See paragraph 5.8.5 COMMISSIONING for commissioning requirements. USACE templates for the required Basis of Design document and Commissioning Plan documents are available at <http://en.sas.usace.army.mil> (click on Engineering Criteria) and may be used at Contractor's option.

5.11.5. DAYLIGHTING. Except where precluded by other project requirements, do the following in at least 75 percent of all spaces occupied for critical visual tasks: achieve a 2 percent glazing factor (calculated in accordance with LEED credit EQ8.1) OR earn LEED Daylighting credit, provide appropriate glare control and provide either automatic dimming controls or occupant-accessible manual lighting controls.

5.11.6. LOW-EMITTING MATERIALS. Except where precluded by other project requirements, use materials with low pollutant emissions, including but not limited to composite wood products, adhesives, sealants, interior paints and finishes, carpet systems and furnishings,

5.11.7. CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT. Except where precluded by other project requirements, earn LEED credit EQ 3.1 Construction IAQ Management Plan, During Construction and credit EQ 3.2 Construction IAQ Management Plan, Before Occupancy.

5.11.8. RECYCLED CONTENT. In addition to complying with section RECYCLED/RECOVERED MATERIALS, earn LEED credit MR4.1, Recycled Content, 10 percent except where precluded by other project requirements.

5.11.9. BIOBASED AND ENVIRONMENTALLY PREFERABLE PRODUCTS. Except where precluded by other project requirements, use materials with biobased content, materials with rapidly renewable content, FSC certified wood products and products that have a lesser or reduced effect on human health and the environment over their lifecycle to the maximum extent practicable.

5.11.10. FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM (FB4P). The Farm Security and Rural Investment Act (FSRIA) of 2002 required the U.S. Department of Agriculture (USDA) to create procurement preferences for biobased products that are applicable to all federal procurement (to designate products for biobased content). For all designated products that are used in this project, meet USDA biobased content rules for them except use of a designated product with USDA biobased content is not required if the biobased product (a) is not available within a reasonable time, (b) fails to meet performance standard or (c) is available only at an unreasonable price. For biobased content product designations, see <http://www.biopreferred.gov/ProposedAndFinalItemDesignations.aspx>.

5.12. CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT: Achievement of 50% diversion, by weight, of all non-hazardous C&D waste debris is required. Reuse of excess soils, recycling of vegetation, alternative daily cover, and wood to energy are not considered diversion in this context, however the Contractor must track and report it. A waste management plan and waste diversion reports are required, as detailed in Section 01 57 20.00 10, ENVIRONMENTAL PROTECTION.

5.13. SECURITY (ANTI-TERRORISM STANDARDS): Unless otherwise specified in Project Specific Requirements, only the minimum protective measures as specified by the current Department of Defense Minimum Antiterrorism Standards for Buildings, UFC 4-010-01, are required for this project. The element of those standards that has the most significant impact on project planning is providing protection against explosives effects. That protection can either be achieved using conventional construction (including specific window requirements) in conjunction with establishing relatively large standoff distances to parking, roadways, and installation perimeters or through building hardening, which will allow lesser standoff distances. Even with the latter, the minimum standoff distances cannot be encroached upon. These setbacks will establish the maximum buildable area. All standards in Appendix B of UFC 4-010-01 must be followed and as many of the recommendations in Appendix C that can reasonably be accommodated should be included. The facility requirements listed in these specifications assume that the minimum standoff distances can be met, permitting conventional construction. Lesser standoff distances (with specific minimums) are not desired, however can be provided, but will require structural hardening for the building. See Project Specific Requirements for project specific siting constraints. The following list highlights the major points but the detailed requirements as presented in Appendix B of UFC 4-010-01 must be followed.

- (a) Standoff distance from roads, parking and installation perimeter; and/or structural blast mitigation
- (b) Blast resistant windows and skylights, including glazing, frames, anchors, and supports
- (c) Progressive collapse resistance for all facilities 3 stories or higher
- (d) Mass notification system (shall also conform to UFC 4-021-01, Mass Notification Systems)
- (e) For facilities with mailrooms (see paragraph 3 for applicability) – mailrooms have separate HVAC systems and are sealed from rest of building

6.0 PROJECT SPECIFIC REQUIREMENTS

6.1. GENERAL

The requirements of this paragraph augment the requirements indicated in Paragraphs 3 through 5.

6.2. APPROVED DEVIATIONS

The following are approved deviations from the requirements stated in Paragraphs 3 through 5 that only apply to this project.

- (a) Paragraph 2.1.1: Delete the first sentence of the 4th paragraph.
- (b) Paragraph 3.4.1.2: Delete the fifth sentence.
- (c) Paragraph 3.4.5.3: Revise table to allow Gypsum Wall Board or Exposed Ceiling in Telecommunications Rooms.
- (d) Paragraph 3.5.1(a): Revise to read "Elevated Floors" instead of "Elevated Slabs".
- (e) In the last sentence of paragraph 3.4.2.2, replace the words "sleeping spaces" with "all surrounding spaces".
- (f) See paragraph 6.10.6.3 for additional corrections and requirements.
- (g) All reference to LEED version 2.2 contained within this RFP should be replaced with LEED version 3.0. This project is required to meet LEED version 3.0, minimum Level Silver.
- (h) This project has received an approved waiver to be exempted from the requirement to provide roof hatches, as required by UFC 3-600-01, paragraph 2-9.

6.3. SITE PLANNING AND DESIGN

6.3.1. General:

The D/B Contractor is responsible for constructing a Basic Training Complex (BTC) to include barracks/company operations facilities (B/COF) and Physical Training areas. This Contract includes the construction of three (3) B/COF facilities (with associated Physical Training Pits and a ¼ mile centrally located track), a Lawn Equipment Building and all supporting elements for the entire Complex. Three B/COF facilities are shown on the attached plans (see Appendix J) as future facilities and are not included in this contract. Refer to the CLIN Schedule for additional information. A Battalion Headquarters (BNHQ) will also be constructed as part of the Complex. Construction of the BNHQ will be by others, under a separate contract and may be constructed concurrently with the B/COF facilities.

Also, a nearby Central Energy Plant (CEP) may be under construction under a separate contract. This project will install underground chilled water piping from the CEP to the BNHQ and B/COF buildings. The D/B Contractor shall coordinate closely with the BNHQ and the CEP Contractors to facilitate the work of all Contractors.

The proposed site for this project is on the south side of Golden Arrow Road directly east of the BTC2 Complex currently under construction. The site is heavily wooded. The D/B Contractor may remove all of the existing trees within the perimeter road along the outside of the Complex. A permit from the State of South Carolina is required for removal of any trees. Allow a minimum of 60 days for permit processing.

The contractor is responsible for cutting of all trees requiring removal regardless of whether or not they are merchantable. Only merchantable trees will be harvested by Fort Jackson DPW Environmental Division. At least 60 days before construction can begin, the clearing limits of the construction site must be marked on the ground. Once the clearing limits have been marked, the Forestry Branch must be notified at 751-4622, so that arrangements can be made to harvest any merchantable timber. Remaining tops, limbs, and small trees are the responsibility of the clearing and grading contractor and not the timber harvesting contractor. The remaining debris will be disposed of

in a mulch site. Merchantable timber remains the property of the Army. All tree clearing shall be closely coordinated with the Installation.

The D/B Contractor's limits of construction for the Complex is designated on the Overall Site Plan, included in Appendix J. The layout shown on the site plans in Appendix J is the Installation's desired site layout, but the D/B Contractor has the option of developing his own site plan. This plan shall be subject to approval by the COR and the Installation. The D/B Contractor shall masterplan and phase the construction site in such a way as to allow construction of the BNHQ to occur concurrently and to allow for the construction of the future three B/COFs. Regardless of whether the D/B Contractor uses the Installation's desired site plan or develops his own site plan, the construction of all perimeter roads, all parking, and all general site grading shall be included in this contract.

The D/B Contractor shall be responsible for the facilities and all supporting off-site and site improvements located within the Complex. The D/B Contractor is responsible for clearing and grubbing operations, demolishing existing site structures and rough and final site grading for the entire Complex, including the portions of the site identified for construction of the BNHQ facility. The D/B Contractor is responsible for rough grading the building pad to within six inches (6") of final grade for the BNHQ facility and for ensuring positive drainage away from all buildings within the Complex. The D/B Contractor shall phase the preparation of the site to allow access to the prepared building pad to the BNHQ Contractor no later than 200 calendar days after receipt of Notice to Proceed. Site preparation includes, but is not limited to, clearing and grubbing, rough grading, and providing site access and a staging area to the BNHQ Contractor. The D/B Contractor is responsible for coordinating with the BNHQ and Contractor for these aspects of construction, as well as temporary utility requirements. The D/B Contractor is also responsible for emergency vehicle and pedestrian access to all facilities within the Complex (including the BNHQ facility).

All construction, renovation, and demolition projects require 50% minimum diversion of construction and demolition (C&D) waste, by weight, from landfill disposal. Contractor must submit a C&D Waste Management Plan IAW UFGS 017419 (see attached). This plan must be approved by Barbara Williams prior to the start of site clearance.

The D/B Contractor is responsible for rerouting Winder Road with a 24 foot wide gravel surface from the point where it is cut off by the construction of the new facilities to Golden Arrow Road or to the new Complex perimeter road. The D/B Contractor is also responsible for providing a new 24 foot wide gravel surfaced access drive from Golden Arrow Road to the existing confidence course. This new access drive shall be constructed and made available for use by the Installation before removing or blocking the use of the existing access drive.

The D/B Contractor is also responsible for bringing off-site telecommunications, electrical and natural gas distribution systems up to the project site boundary and for providing telecommunication, natural gas, and electrical services to all facilities being constructed within the project site boundary, including to within 5' of the BNHQ facility (except for the electrical service which shall be terminated at 33 feet line from the BNHQ). The utilities brought to the site by the D/B Contractor shall be sized to accommodate the facilities included in this contract as well as the BNHQ facility and the future three B/COFs. Any onsite utility services shall be sized and routed to allow for connection of service lines to the future facilities within the Complex. The D/B Contractor shall coordinate design requirements and criteria, permits and schedules with the BNHQ Contractor. Limits of responsibility are further described herein. The Water and wastewater are privatized distribution systems and are owned by Palmetto State Utility Services (PSUS). See the demarcation matrix located in Appendix GG for additional areas of responsibility.

6.3.1.1 Adjacent Construction Projects: The D/B Building Contractor should be aware that other projects within the project site boundaries may be under construction concurrently. The BNHQ facility will be constructed under separate contract and construction schedules may run concurrently with the construction of the facilities and site amenities included in this contract. A new Central Energy Plant (CEP) may also be under construction (north of the project site). This project will include the construction of new chilled water piping to the project site and to the new Barracks and BNHQ buildings. The D/B Contractor shall provide advance notice to the COR when work is scheduled in areas that overlap with areas of construction by others. Coordination, if required, can then be accomplished between all Contractors through the COR.

6.3.1.2 Recycling Center: Ft. Jackson has an on post Recycling Center located at 5671 Lee Road. The D/B Contractor shall coordinate with the COR, the Directorate of Contracting (DOC), and Ft. Jackson's DPW for the Installation's recycling policies and procedures during construction.

6.3.2. Site Structures and Amenities

6.3.2.1 The D/B Contractor shall be responsible for coordinating his site design with the Overall Site Plan and other Contractor(s) working on this or nearby sites. The design and construction of walkways (B/COF and BNHQ), gathering areas, site amenities, POV parking (B/COF and BNHQ), AT/FP elements, and the installation of these items within the Complex construction limits shall be the responsibility of the D/B Contractor. The D/B Contractor shall coordinate walk locations with the BNHQ Contractor. Provide rounded fillets at sidewalk intersections. The D/B Contractor shall also provide sidewalks to the 5' line of the BNHQ facility and shall coordinate the location of the walks with the BNHQ Contractor. The Troop access walkway from the Complex perimeter road to the existing DFAC located adjacent to and directly west of the project site shall be a minimum of 30 feet wide. Other Troop access walkways shall be a minimum of 10 feet wide.

6.3.2.2 Site Deviations: Upon finalizing the site layout, the D/B Contractor shall provide proposed building locations, site orientation, and requests for deviations from the Site Plan to the COR for approval and coordination, as applicable with adjacent building construction. The Government/COR will enforce coordination of proposed buildings and finalize the placement of the building(s) within the designated boundaries and finalize associated site grading around the proposed facilities. However, the D/B Contractor shall be responsible for coordination efforts with work by others on adjacent sites within the Complex. Desired building placement within the designated Complex construction area may be modified by the COR, if deemed necessary.

6.3.2.3 Dumpster Enclosures: Fort Jackson utilizes side loading dumpsters for its recycling operations. Contact Richard Lucas at (803) 751-4208 for additional recycling and dumpster information. The D/B Contractor is responsible for providing dumpster enclosures for the B/COFs and the BNHQ facility. The BNHQ building will be procured and constructed under separate contract. The GFGI dumpsters (both trash and recycling) are front loading type, standard 8 cubic yards.

6.3.2.4 Crash Barriers: The D/B Contractor shall provide a cable crash beam barrier at all entrances to the Complex, in accordance with UFC 4-010-01.

6.3.3. Site Functional Requirements:

6.3.3.1. Stormwater Management (SWM) Systems.

The D/B Contractor is responsible for the Complex's storm drainage system, including roof drains, above ground systems, and underground systems, as applicable. Roof drains shall be tied into the underground system, if applicable. Splash blocks shall be provided if no underground drainage system exists on the site. The D/B Contractor shall obtain roof drainage calculations and points of connection from the BNHQ Contractor for inclusion in the Complex's drainage calculations. The BNHQ Contractor shall provide their roof area drainage calculations to the D/B Contractor within 15 days of their receipt of Notice to Proceed.

6.3.3.2. Erosion and Sediment Control

The Storm Water Pollution Prevention Plan (SWPPP) shall conform to NPDES. The Barracks D/B Contractor shall provide and maintain his pollution prevention plan throughout the duration of the contract. The Contractor is responsible for the design and construction of storm water detention, soil and erosion control measures, and the design of the storm drainage system within the designated construction area, including the BNHQ portion of the Complex. The D/B Contractor shall utilize flow spreaders downstream of the pond outfall, if possible.

Refer to paragraph 6.16 for permit requirements. The BNHQ Contractor shall be a co-permittee during construction of the BNHQ facility and is required to maintain and/or replace any storm water structures damaged as a result of his construction operations. For the duration of the contract, the D/B Contractor is responsible for the entire SWPPP within the Complex construction site limits. The D/B Contractor is also responsible for providing erosion control for all off-site utility construction.

6.3.3.3. Vehicular Circulation.

BNHQ Service Drive: The D/B Contractor shall provide a service drive to the 5 foot line of the BNHQ. The D/B and BNHQ Contractors shall coordinate closely with each other for the alignment of the service drive to the BNHQ. The drive shall be located IAW UFC 4-010-01. Where applicable, access to the drives shall be restricted as required by UFC 4-010-01. Drives shall be provided with curb and gutter. Minimum service drive width shall be 24 feet (to back of curb). Minimum turning radius shall be designed as required for emergency vehicle access. The minimum

turning radius design shall accommodate the HM100 Aerial with Pump with Cyclone II Chassis fire truck. The requirements for the emergency vehicle access shall be closely coordinated with the Fort Jackson Fire Department and the DPW. The geometric design of the roads and drives shall be in accordance with AASHTO.

6.4. SITE ENGINEERING

6.4.1. Existing Topographical Conditions

No new survey has been completed for the site. The D/B Contractor shall provide a three dimensional digital topographic and utility (two dimensional) survey for the site. The additional survey shall match the coordinate system used by the Installation. The D/B Contractor shall make the survey available for use by the BNHQ Contractor. Existing site GIS data from the Installation GIS has been used in the preparation of the attached plans. This data is included in Appendix G of this RFP for information only. The information shown related to the new BTC2 Complex on the attached plans is also shown for information only and has not been verified.

It is the D/B Contractor's responsibility to verify the Government furnished information and obtain all survey information that may be required for design and construction of the project. Any discrepancies which are found in the Government furnished information shall be brought to the immediate attention of the Government for clarification.

There are wetlands along the southern edge of the site. The site is heavily wooded. The D/B Contractor is not required to preserve trees within the Complex perimeter access road.

6.4.1.1 All spatial data (point, line, and polygon) and tabular data will be delivered in ESRI ArcGIS compatible format. A geodatabase with feature classes, etc. will meet this expectation. Original source files and drawing files shall also be sent as hard-copy and digital. All spatial data shall be referenced to UTM Zone 17N WGS84. ESRI data models shall be utilized where appropriate. Compliance with the DOD Spatial Data Standards for Facilities Infrastructure and the Environment (SDSFIE) metadata standard shall be utilized where appropriate. Topological rules shall be established and verified with applicable standards. Data delivered shall have robust explanation of methodology utilized outlined in metadata. Quality assurance plans are available and can be disseminated as appropriate. All locational data shall overlay on the installation's latest base map. All accuracy errors shall be reported to the installation's point of contact for this effort. The A-E shall use conventional surveying and other methods, such as a total station or Global Positioning Systems (GPS) for field data collection at an accuracy level in accordance with "Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy," published by the Federal Geographic Data Committee (FGDC), dated July 1998.

6.4.2. Existing Geotechnical conditions: See Appendix A for a preliminary geotechnical report.

No new subsurface investigation has been completed for this project.

The D/B Contractor shall accept the site as is and be solely responsible for any geotechnical investigations required to accommodate his proposed foundation and other site features (as required by his final geotechnical report).

The D/B Contractor is required to perform a full geotechnical investigation and design in order to determine existing soil and ground conditions. The D/B Contractor is also responsible for obtaining the necessary geotechnical data required for proper design of pavement sections, building foundations and any necessary equipment slabs.

6.4.3. Fire Flow Tests See Appendix D for results of fire flow tests to use for basis of design for fire flow and domestic water supply requirements.

Fire flow information is included in Appendix D. The data provided is for fire hydrant 707 near the existing water tower (also near the connection point). The D/B Contractor shall be responsible for the fire flow test used in his design and construction. The available pressure in the domestic water system for pipe sizing purposes shall be 50 psi at the building fire demand.

6.4.4. Pavement Engineering and Traffic Estimates:

The D/B Contractor shall coordinate with the DPW to determine traffic estimates for the site access drives. The D/B Contractor shall coordinate with the DPW on the design vehicle for all pavements. The design of the

pavements for emergency vehicle access shall include the HM100 Aerial with Pump with Cyclone II Chassis fire truck. The requirements for the emergency vehicle access pavement shall be closely coordinated with the Fort Jackson Fire Department and the DPW.

The pavement design shall be as required by paragraph 5.2.3 VEHICLE PAVEMENTS. A professional engineer, licensed in the State of South Carolina, shall design all rigid and flexible pavements in accordance with the Contractor's final geotechnical report. Paved roads and parking areas shall be provided with a curb and gutter.

6.4.5. Traffic Signage and Pavement Markings

Not used.

6.4.6. Base Utility Information

6.4.6.1 General

The distance from the Complex site to existing utility tie in locations is different for each utility but is generally about 2,500 to 8,000 feet away to the south and/or west. There are existing utility lines at the existing facilities adjacent to and west of the Complex site. However, these new utilities were generally only designed and constructed for the facilities they serve and cannot handle the additional loading of the facilities included in this contract. There will be coordination and, in some cases, tie-ins with these newly constructed utilities. See each utility below for additional details.

The D/B Contractor is responsible for coordinating with utility owners regarding utility connections and outages. Specific utility outages required by the D/B Contractor shall be coordinated a minimum of seventy-eight (78) hours in advance through the COR. Additional coordination requirements are included below.

Prior to final design, the D/B Contractor shall coordinate with the locations and sizes of utility services with the utility owners, the DPW and the BNHQ Contractor. All offsite utility extensions and any onsite looped or distribution systems shall be designed and constructed to provide adequate capacity for all phases of development of the BTC3 Complex including 6 B/COFs (3 in this contract and 3 future) and the BNHQ (by others in separate contract).

Open cut utility construction is allowed on Golden Arrow Road only. Jack and Bore construction shall be done at all other road crossings. Where open cut construction is done the utility crossings shall be grouped. No individual road cut is allowed. The pavement section shall be replaced to match the existing section at open cut construction operations. Where utility lines cross the wetlands along the south side of the project site, the D/B Contractor shall obtain the appropriate permits from the State of South Carolina and the Installation to work within and cross the wetlands. Above ground crossings may be required for the wetlands crossing.

Any discrepancies found between the Statement of Work and the Appendices shall be immediately brought to the attention of the COR for clarification. The D/B Contractor shall confirm all required utility loads prior to final design. All utility meters shall be provided and installed as noted below. One connection point for each utility will be provided for each building. Utility connections will be made available to each proposed building as noted for each utility below.

Prior to the start of construction, the D/B Contractor shall conduct utility coordination meetings with the Contracting Officer's Representative (COR), PSUS and Fort Jackson's Directorate of Public Works (DPW). Contact David Wiman at (803) 790-7288, for water and wastewater information. Contact Georges Dib, DPW, at (803) 751-3823, for gas and electric information. The Contractor shall use the coordination meetings to identify utility lines impacted by project construction and verify working status of the existing lines. The Contractor shall coordinate the proposed work on impacted utility lines with the appropriate utility owner. Utility impacts to be coordinated shall include, but are not limited to, removals, temporary service then removal, and permanent relocations, where applicable.

The D/B Contractor is required to coordinate with PSUS within 14 days of notice to proceed for temporary water service for use during construction.

6.4.6.2 Electrical

The D/B Contractor is responsible for the bringing electric services to the Complex site and for the design and

construction of the Complex's electrical distribution system, including to the 33' line of the BNHQ facility, which will be constructed by others under a separate contract.

6.4.6.2.1 Offsite Work

New overhead electrical service has been recently constructed along Golden Arrow Road and from the easement west of Dixie Road to the BTC2. The intent of the neighboring BTC2 electrical service design was to provide adequate capacity to serve the BCT3 as well. The Contractor shall be responsible for coordinating with the DPW and USACE to determine if the existing power to BTC2 is adequately sized to assume the load of BCT3. If it is determined that the existing service is adequate, the contractor shall be responsible for extending the service to the BCT3. If it is determined that the existing primary electrical service is not adequate, the contractor shall be responsible for providing a new service from the substation which is estimated to be constructed and completed before the completion of BCT3. This substation is to be located near the intersection of Nicholas Street and Forest Drive. The D/B Contractor may be able to attach new power lines to these existing power poles. See section 6.9 SITE ELECTRICAL for additional details.

6.4.6.2.2 Work Within BTC3 Complex

The D/B Contractor shall be responsible for placing the primary electrical service within 33' of each facility within the BCT3 (including the BNHQ). The D/B Contractor shall cap the conduit to the BNHQ at the 33' line of the BNHQ and leave wire coiled in nearest manhole with enough length to reach the 33' line plus 20'. This location should serve as the location of the BNHQ Contractor provided transformer serving the BNHQ and should be coordinated with the BNHQ Contractor. The D/B Contractor shall provide the pad-mounted transformers, transformer pads, and meters for the B/COFs and LEB. The BNHQ Contractor will make the necessary primary and secondary termination to his transformer. The D/B Contractor shall coordinate closely with the BNHQ Contractor, the DPW, and the COR. Light poles should be placed on a concrete base and height shall be such that maintenance can be done using standard equipment. See Appendix FF for BTC2 site electrical design and telephone utility drawings.

6.4.6.3 Telecommunications

Telecommunications service will originate at the telecommunications building at the west side of the intersection of Golden Arrow Rd. and Dixie Rd. which is to be constructed during and completed before the completion of this project. Telecommunications service shall be coordinated through the COR with Fort Jackson's Network Enterprise Center (NEC). The D/B Contractor is responsible for providing required services to the 5' line of the BNHQ facility nearest to the BNHQ main telecommunications room on the south side of the BNHQ.

6.4.6.3.1 Offsite Work

There is an existing underground duct bank from the intersection of Dixie Rd and Golden Arrow Rd to the BTC2. Service will be extended to the primary communications manhole, as shown in Appendix J, by the D/B Contractor. Design and installation of the trunk systems shall be provided by the D/B Contractor in coordination with Fort Jackson's NEC. Provide a minimum of six 6" underground ducts from the existing manhole at the BTC2 to a new manhole at the BCT3 near the BCT3 complex boundary. Cables shall be pulled from the telecommunications building at the intersection of Golden Arrow Road and Dixie Road within an existing duct bank running through BTC2 and through the new duct banks from the BTC2 to be constructed under this contract and shall be coiled and spliced in the primary communications manhole shown in Appendix J. Provide manholes in accordance with I3A guidelines.

6.4.6.3.2 Work Within BTC3 Complex

The D/B Contractor is responsible for duct bank and cable routing from the new primary communications manhole to the specified connection points for the each facility, including the BNHQ. Conduit and cabling into the B/COF communications rooms shall be designed and installed by the D/B Contractor. Duct banks shall be a minimum of four 4"C throughout the BCT3 complex. See paragraph 6.9.4 Exterior Telecommunications for additional information.

6.4.6.4 Domestic / Fire Water

The water distribution network at Fort Jackson is a combined system (domestic water and fire protection water) and is owned by Palmetto State Utility Services (PSUS). The D/B Contractor is responsible for providing sufficient water

volume and pressure to supply domestic water and fire protection for the entire complex. The D/B Contractor shall provide water service to all facilities within the Complex, including the BNHQ facility. The D/B Contractor shall design and construct the new water distribution system (including a booster pump, if needed) in accordance with PSUS standards. PSUS is currently developing a model for the entire Installation water distribution system. The D/B Contractor shall coordinate with PSUS (through Mr. Jeff Johnson, PE of Richard Brady & Associates at 704-509-6006) on the availability of design information and requirements related to the water service for the project and the water distribution model.

Installation of potable water utilities from the point of connection to the 5 foot line of the facilities shall be subject to tap, new project (engineering design review, operational evaluation, and operational support), and inspection fees payable to PSUS by the D/B Contractor. These fees shall be included as separate line items in the D/B Contractor's bid and PSUS's proposal breakdown shall be provided to the Government upon request. The D/B Contractor must submit a site plan containing the layout of potable water utilities to PSUS a minimum of two weeks prior to submitting a bid.

6.4.6.4.1 Offsite Work

The D/B Contractor is responsible for extending approximately 2200 feet of water main along the wooded area south of the project Complex from a connection point on the 10 inch line near the existing water tower to the Complex boundary. Also, the D/B Contractor shall be responsible for designing, providing and installing a booster pump at a location to be determined by PSUS and the Installation to provide pressure and flow rates to the proposed BTC3 facilities (6 B/COFs and BNHQ) as required. The booster pump, if needed, will likely be located in the vicinity of the Starship 12000 building. The D/B Contractor shall also connect to the recently installed water line along Golden Arrow Road that provides service to the BTC2 Complex. The connection location and details shall be in accordance with the PSUS standards and in coordination with PSUS.

6.4.6.4.2 Work Within BTC3 Complex:

The D/B Contractor shall be responsible for the design and construction of new water infrastructure in accordance with PSUS standards to within 5' of the buildings within the Complex (including to within 5' of the BNHQ facility – the water service line shall be capped at the termination point). This shall include a combined water system looped around the site to maintain pressure and flow and a tie in to the existing water line along Golden Arrow Road near the new BTC2 Complex. The water line loop shall be designed and constructed along the perimeter of the Complex. The BNHQ Contractor is responsible for providing water service from the 5' line to the BNHQ facility. Utility information shall be coordinated and planned with PSUS, Fort Jackson's DPW and the COR. Appendices C and J provide proposed utility main routing and general orientation for points of connection for each facility. Specific connection locations are noted below. Contact Georges Dib, DPW, at (803) 751-3823, for electric and gas requirements. Contact David Wiman (PSUS) at (803) 790-7288, for water and wastewater requirements.

The D/B Contractor shall provide and install the domestic water backflow preventer and meter, and the fire water PIV and backflow preventer and the Fire Department Connection (FDC) for each facility (3 B/COFs and the BNHQ). The BNHQ Contractor is responsible for furnishing his utility demand requirements and calculations to the D/B Contractor within 15 days of his receipt of Notice to Proceed. The BNHQ Contractor is responsible for coordinating his connection point requirements with the D/B Contractor and for extending the service line from the 5 foot line to the BNHQ facility. Refer to Appendix J for proposed locations.

6.4.6.5 Sanitary Sewer / Wastewater

The sanitary sewer system at Fort Jackson is owned by Palmetto State Utility Services (PSUS). The D/B Contractor shall be responsible for the design and construction of new wastewater infrastructure in accordance with PSUS standards to the project site (including a sanitary sewer lift station and force main) as well as a gravity sanitary sewer collection system (see Appendix J for more information). Some work may also be required to improve the existing downstream system to enable it to handle the additional flows from this project. The BNHQ Contractor is responsible for providing sanitary sewer service from the 5' line to the BNHQ facility. The new Complex collection system, the lift station, and the force main shall be designed to handle all phases of development for the Complex including 6 BCOFs and the BNHQ.

Installation of sanitary sewer utilities from the point of connection to the 5 foot line of the facilities shall be subject to tap, new project (engineering design review, operational evaluation, and operational support), and inspection fees payable to PSUS by the D/B Contractor. These fees shall be included as separate line items in the D/B

Contractor's bid and PSUS's proposal breakdown shall be provided to the Government upon request. The D/B Contractor must submit a site plan containing the layout of potable water utilities to PSUS a minimum of two weeks prior to submitting a bid.

6.4.6.5.1 Offsite Work

Off-site sanitary sewer infrastructure is shown on the proposed Utility Plans, located in Appendix J. Points of connection and construction requirements shall be coordinated through the COR with the utility owner.

The D/B Contractor is responsible for extending the existing sanitary sewer system to the Complex. Approximately 2,800 of new force main shall be extended from the area near BTC I southwest of the project site (see Utility Plans in Appendix J), across the wetland to the project boundary. Due to grade constraints, a lift station is required. The lift station shall be designed and constructed by the D/B Contractor. The D/B Contractor shall coordinate with the BNHQ Contractor for demand requirements and connection locations. The BNHQ Contractor is responsible for furnishing his utility demand requirements and calculations to D/B Contractor within 15 days of his receipt of Notice to Proceed. Refer to Appendix J for locations.

Improvements to the existing sanitary sewer system downstream from the connection point will also be required and is the responsibility of the D/B Contractor (see Utility Plans in Appendix J). The D/B Contractor shall coordinate with Mr. Jeff Johnson, PE of Richard Brady & Associates at 704-509-6006 on the extent and details of the required improvements to the existing system. PSUS is currently developing a model of the entire Installation Sanitary Sewer System. The information from the model will be available to the D/B Contractor for use in the design of the new facilities and the design of improvements to the existing system. The improvements to the existing system are expected to include two areas. The first is from the connection point of the new force main required for this project downstream to an existing manhole that will need to be deepened. This location can be seen on the Utility Plans in Appendix J. The work from the connection point to the manhole is expected to include the replacement of the existing manholes and the replacement of the existing 15 inch sewer main with a 24 inch sewer main. The sizing, profile, and construction of the improvement is the responsibility of the D/B Contractor. The design shall be closely coordinated with PSUS and shall be based on the data that will be available from the system model. The second area that may require improvements is from the manhole that will need to be deepened (see Utility Plans in Appendix J for location) downstream to the location shown on the Utility Plans. The improvements to this section will include replacing the existing manhole with a deeper manhole and adjusting approximately 350 linear feet of existing 24 inch sewer main downstream. This work is included in this project and is the responsibility of the D/B Contractor. The design of these improvements shall be closely coordinate with PSUS and shall be based on the data that will be available from the system model. The design and construction of this second area of possible improvements may be completed by others before the work on this project begins.

6.4.6.5.2 Work Within BTC3 Complex

The D/B Contractor is responsible for the design and construction of the gravity sewer collection system within the Complex and the service lines to the 3 B/COFs and to the 5 foot line of the BNHQ facility. The BNHQ Contractor is responsible for furnishing his utility demand requirements and calculations to the D/B Contractor within 15 days of his receipt of Notice to Proceed. The BNHQ Contractor is responsible for coordinating his connection point requirements with the D/B Contractor and for extending the service line from the 5 foot line to the BNHQ facility. Refer to Appendix J for proposed locations.

6.4.6.6 Natural Gas

The D/B Contractor is responsible for bringing natural gas distribution to the Complex site and for the design and construction of the gas system to the 5' line of the three B/COFs and the BNHQ.

Natural Gas distribution lines are shown on the utility exhibit, Appendix C. Natural gas shall be constructed to the 5' line of the all facilities including the BNHQ. Design and construction requirements shall be coordinated with the DPW.

6.4.6.6.1 Offsite Work

The proposed source for natural gas is the Kemper Street gas main. Natural gas will be brought to the Complex construction site boundary by the D/B Contractor. Approximately 8,000 feet of new 6" gas line will be extended west along Hampton Parkway, north along Dixie Road, then east along Golden Arrow Road. The gas connection to the

existing gas main shall be a hot tap connection and a pressure reducing station shall be located within the Complex site limits and shall be designed and constructed by the D/B Contractor.

6.4.6.6.2 Work Within BTC3 Complex

The D/B Contractor shall design and install the site gas distribution piping to all three B/COFs and to the BNHQ facility. The looped gas distribution main shall be sized to allow for connection of the 3 future B/COFs without extending or upsizing the gas main. The D/B Contractor is responsible for designing and installing gas service lines to the 5' line of the facilities (including the BNHQ facility). The D/B Contractor shall provide and install a gas meter for the each facility (including the BNHQ facility). The service line for the BNHQ facility shall terminate at a valve box and be capped within 5' of the BNHQ. The BNHQ Contractor is required to submit to the D/B Contractor, in writing, the gas requirements for the BNHQ within 15 days of their receipt of Notice to Proceed. The BNHQ Contractor and the D/B Contractor shall coordinate the gas service meter and termination point locations. The BNHQ Contractor is responsible for service from the 5' line to the BNHQ. The D/B Contractor is not responsible for costs incurred for construction services provided by the BNHQ Contractor. Coordinate with the DPW.

6.4.6.7 Cable TV (CATV)

CATV is privatized and will be provided by Time Warner. Design and service to the Complex's buildings will be provided by Time Warner after contract completion.

6.4.7. Cut and Fill

The D/B Contractor is responsible for rough and final site grading, erosion and sediment control and for drainage of the entire site within the Complex (including the BNHQ site) and for providing compacted and rough graded building pads to the BNHQ Contractor for his use. The BNHQ Contractor is responsible for the final building pad compaction required for the BNHQ facility. If fill material is required, the D/B Contractor shall obtain the additional material off post and at his expense. If there is excess material, the Contractor shall legally dispose of the materials off site. The D/B Contractor shall furnish the Finish Grade Elevations (within six inches of the proposed finished floor) to the BNHQ Contractor. The D/B Contractor shall coordinate the building's site grading and other site aspects with other Contractors working on adjacent sites, where applicable.

The finished grades adjacent to the new building will be a minimum of 6" below finished floor except where grades are required on walk ways and entrances to buildings that are handicap accessible. Finish grades will slope away from the building at 5% for the first 10 feet and then will slope at a minimum of 1% to existing or new storm drainage. A preferred minimum gradient of 1.0 percent shall be used in all parking areas. The maximum gradient used parallel from front to rear of a space shall be 5 percent and from side to side (width of the space) shall be 1 ½ percent.

Cut and fill operations shall conform to Army requirement for 50% diversion rate.

6.4.8. Borrow Material

No fill material is available on post. If additional fill material is required, the D/B Contractor shall obtain the additional material off post and at his expense.

6.4.9. Haul Routes and Staging Areas

Routing of haul roads shall be coordinated with the COR and the DPW. An Installation map with available haul route, construction entrance gate, security requirements and project location is provided in Appendix J.

The D/B Contractor's staging areas shall be within the Complex's limits of construction. The BNHQ Contractor's staging area will also be within the Complex's limits of construction. The D/B Contractor shall be responsible for assigning staging area locations to the BNHQ Contractor within 200 calendar days from Notice to Proceed. Final location(s) will be determined at the pre-construction conference. The D/B Contractor shall be responsible for the site preparation, fencing, access drives, and maintenance of the compound at all times. Privacy slats shall be provided on fencing (color as directed by the COR). The BNHQ Contractor is responsible for maintaining his assigned staging area(s). Staging areas and haul routes shall be coordinated with the COR and the DPW.

Contractor shall confirm haul routes and permitted construction hours with Fort Jackson and USACE. See Appendix P for additional information.

Also, a nearby Central Energy Plant (CEP) may be under construction under a separate contract. This project will install underground chilled water piping from the CEP to the BNHQ and B/COF buildings. The D/B Contractor shall coordinate closely with the BNHQ and the CEP Contractors to facilitate the work of all Contractors. The CEP Contractor will have a separate staging area.

There are no known existing utilities located near the construction site other than those recently extended to the BTC2 Complex west of the project site. These newly extended utilities were generally extended from the west and south of the BTC2 Complex site. The Contractor is responsible for his own temporary utilities until utilities are brought to the Complex boundary. The D/B Contractor is also responsible for providing temporary utilities to the BNHQ Contractor. The D/B Contractor is responsible for temporary utility costs as required by the utility owner and the DPW. The D/B Contractor is required to coordinate with the COR and the DPW within 14 days of the receipt of the Notice to Proceed. Generators shall be allowed for on-site electrical service but are not permitted once the facility is connected to the grid.

6.4.10. Clearing and Grubbing:

The D/B Contractor is responsible for clearing and grubbing of the entire site within the Complex (including the BNHQ site) and for other areas as required including the area for the storm water detention pond and utility corridors that cross wooded areas. Within the site complex, no existing trees are required to be saved. See paragraph 6.3.1 for additional information. Fort Jackson will notify the D/B Contractor if merchantable tree sales are required and arrange appropriate disposal of said timber. Allow the Government 60 calendar days to remove merchantable timber once the D/B Contractor has flagged the trees to be removed. Merchantable timber sales do not include stump or limb removal. Remove all stumps and limbs from the project site.

6.4.11. Landscaping:

6.4.11.1 Complex Landscaping: The D/B Contractor is responsible for landscaping the entire project site within the designated BT Complex construction limits, including the BNHQ portion of the site. Landscaping shall match the overall theme of the Installation. Proposed plantings must be reviewed to ensure that site conditions (soil, topography, adjacent uses, and architecture) and climatic criteria (sun, shade, and moisture requirements) are considered in the desired plant design and selection (i.e., form, texture, color, size). Use a combination of evergreen and deciduous trees to provide windbreak protection from prevailing winds. Landscape planting should be used to supplement dumpster enclosures. Enhance open space areas with planting and use a mix of evergreen, deciduous, and flowering trees.

6.4.11.2 Entry Landscaping: Landscaping at buildings shall provide a positive sense of arrival. Pavement and proper placement of trees, shrubs, and groundcover are to direct pedestrians to the entrance. The character of the plantings of the adjacent areas is to be considered as well as streetscape plantings. A key goal is to provide emphasis for important buildings while harmonizing with surrounding area. Emphasis should be on primary entrances with secondary entrances treated as scaled down versions of primary.

6.4.11.3 Plant List: The plant list and categories are designed to help the designer choose the best plant for each particular set of design requirements. See Appendix I for the Installation's Acceptable Plant List.

6.4.11.4 Irrigation: No irrigation is included in this project.

6.4.12. Turf:

The preferred method for the establishment of turf is seeding. However, the D/B Contractor may substitute sodding for seeding if desired. See Appendix I and coordinate with the DPW for the preferred grass type(s). No irrigation is included in this project.

6.5. ARCHITECTURE

6.5.1. General: To the maximum extent possible within the contract cost limitation, the buildings shall conform to the look and feel of the architectural style and shall use the same colors as adjacent facilities as expressed herein .

The Government will evaluate the extent to which the proposal is compatible with the architectural theme expressed in the RFP during the contract or task order competition. The first priority in order of importance is that the design provides comparable building mass, size, height, and configuration compared to the architectural theme expressed herein. The second priority is that design is providing compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching nearby and installation material/color pallets, as described herein.

6.5.2. Design

6.5.2.1. Appendix F is provided "For Information Only", to establish the desired site and architectural themes for the area. Appendix F identifies the desired project look and feel based on Fort Jackson's Installation Architectural Theme from existing and proposed adjacent building forms; i.e. building exterior skin, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, exterior color schemes, and organizational layout.

6.5.2.2. The design should address Fort Jackson's identified preferences. Implement these preferences considering the following:

- (a) Achievable within the Construction Contract Cost Limitation (CCL)
- (b) Meets Milestones within Maximum Performance Duration.
- (c) Achieves Full Scope identified in this Solicitation
- (d) Best Life-Cycle Cost Design
- (e) Meets the Specified Sustainable Design and LEED requirements
- (f) Complies with Energy Conservation Requirements Specified in this RFP.

6.5.2.3. Priority #1. Visual Compatibility: Facility Massing (Size, Height, Spacing, Architectural Theme, etc.) Exterior Aesthetic Considerations: The buildings massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are sympathetic to the style and context of the Installation. The Installation's intent for this area is:

Provide facilities that are fundamentally sustainable, require minimum operation and maintenance inputs and blend harmoniously with existing style and context of development on Fort Jackson.

6.5.2.4. Priority #2. Architectural Compatibility: Exterior Design Elements (Materials, Style, Construction Details, etc.) Roofs, Exterior Skin, and Windows & Door Fenestrations should promote a visually appealing compatibility with the desired character while not sacrificing the integrity and technical competency of building systems.

6.5.2.5. See Appendix F for exterior colors that apply to Architectural character at Fort Jackson. The manufacturers and materials referenced are intended to establish color only, and are not intended to limit manufacturers and material selections.

6.5.2.6. Additional architectural requirements:

- (a) Install fall protection anchor points on all roofs with a slope greater than 2:12
- (b) Design the Barracks to enhance and complement the visual environment of the Installation. Exterior elements of these facilities shall be in accordance with the architectural character of adjacent BTC2 facilities, unless required otherwise by applicable codes. Refer to photos in Appendix F, which shall be used to establish the Architectural Theme for the area under construction. Configure building massing and use exterior elements and material detailing to provide human scale.

6.5.2.7 In addition to the hardware specified in paragraph 3.4.1, also provide panic hardware on all building egress doors, as required by code.

6.5.2.8 Dryers specified in paragraph 3.2.2.2(e) will be electric.

6.5.2.9 The Secure Storage specified in paragraph 3.2.2.1(j) shall comply with paragraph 3-6 and Appendix B-2 of AR 190-51, Security of Unclassified Army Property (Sensitive and Nonsensitive).

6.5.2.10 In addition to the requirements specified in paragraphs 3.4.5.2(d)(e), reference USG Gypsum Construction Handbook, Chapter 5, for acceptable finish levels.

6.5.2.11 Provide water coolers in accordance with the International Plumbing Code. Provide a minimum of one per floor.

6.5.3. Programmable Electronic Key Card Access Systems:

Not applicable.

6.5.4. INTERIOR DESIGN

6.5.4.1 Fire Extinguisher Cabinets

The fire extinguisher cabinets, specified in paragraphs 3.4.4.6 and 5.10.3, shall be recess mounted cabinets. Cabinets shall not require breaking glass to access fire extinguishers.

Interior building signage requirements:

There are no additional interior signage requirements.

6.6. STRUCTURAL DESIGN

6.6.1 General:

The B/COF is a multi-story building. Consider mission effectiveness, the most economical system in the locality, life-cycle economics, and space adaptability in choosing the structural systems. Space adaptability includes future reorganization or relocation of space. Analyze, design, and detail the facility as complete structural systems. Structural elements shall be designed to preclude damage to finishes, partitions, and other frangible, nonstructural elements; to prevent impaired operability of moveable components; and to prevent cladding leakage and roof ponding. Limit deflections of structural members to the most stringent allowable values specified by the applicable material standard, e.g. ACI, AISC, Brick Industry Association (BIA). All structural components and main force resisting systems shall conform to the requirements of section 1.3 of ASCE 7 and IBC section 1604.4 regarding relative rigidities and support of non-structural items or systems.

Consider climate conditions, high humidity, industrial atmosphere, saltwater exposure, or other adverse conditions when selecting the type of cement and admixtures used in concrete, the concrete cover on reinforcing steel, coatings on structural members, expansion joints, the level of corrosion protection, and the structural systems. All concrete shall be a minimum of 3,000 psi and shall be steel reinforced. Place floor mounted mechanical and electrical equipment on a 4 inch minimum concrete pad.

In addition to gravity, seismic, and lateral loads, design ancillary building items, e.g. doors, window jambs and connections, overhead architectural features, and equipment bracing, for the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Ensure and document that the design of glazed items includes, but is not limited to, the following items under the design loads prescribed in UFC 4-010-01:

(a) Supporting members of glazed elements, e.g. window jamb, sill, header

(b) Connections of glazed element to supporting members, e.g. window to header

(c) Connections of supporting members to each other, e.g. header to jamb

(d) Connections of supporting members to structural system, e.g. jamb to foundation

6.6.2 Applicable Standards, Codes and Criteria

The structural design shall fully comply with the following listed criteria in addition to the provisions provided in Section 01 10 00 paragraph 4.0 APPLICABLE CRITERIA. Use the latest edition of the International Building Code (IBC) for design guidance, and coordinate design with UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. For buildings three stories and taller, design for progressive collapse in accordance with UFC 4-023-03, Design of Buildings to Resist Progressive Collapse.

6.6.3 Project Specific Design Loads:

6.6.3.1. Ground Snow: 10 psf

6.6.3.2. Basic Wind Speed: 97 mph, Exposure C.

6.6.3.3. Seismic Design Data: The mapped maximum considered earthquake (MCE) spectral response accelerations for site class B are:

S_s (at short periods) = 56 % g

S₁ (at 1-second period) = 15 % g.

The acceleration values identified are for the general location of the facility. Verify and use site specific criteria based on the final site location of the facility. Adjust site class per IBC to match specific site information in geotechnical report .

6.6.4 Antiterrorism Force Protection Design

Antiterrorism design requirements including progressive collapse and window glazing shall be incorporated into the design as per UFC 4-010-01. For design of structural components subjected to dynamic loads, the U.S. Army Corps of Engineers Protective Design Center (PDC) developed Single-Degree-of-Freedom Blast Effects Design Spreadsheets (SBEDS). SBEDS is available at the software tab of the PDC website, [HYPERLINK "https://pdc.usace.army.mil/"https://pdc.usace.army.mil/](https://pdc.usace.army.mil/).

6.6.5 Foundation

The foundation is site specific and must be designed upon known geotechnical considerations, by an engineer knowledgeable of the local conditions, e.g. expansive soils, groundwater levels. Coordinate the need for a vapor barrier with the architectural floor finishes and requirements of the geotechnical report. All slab-on-grade to receive a coating (e.g. epoxy) or to receive an overlaying finish (e.g. carpet or tile), shall be underlain by a vapor barrier system with a minimum 10-mil polyethylene membrane.

6.6.6 Design Analysis

Computer generated calculations must identify the program name, source and version. Provide data, including loads, loading diagrams, node diagrams, and adequate documentation to illustrate the design. The schematic models used for input must show, as a minimum, nodes/joints, elements/members, materials/properties, and all loadings, induced settlements/deflections, etc., and a list of load combinations. Results must include an output listing for maximum/minimum stresses/forces and deflections for each loading case and combination.

6.7. THERMAL PERFORMANCE

6.7.1 No additional requirements.

6.8. PLUMBING

6.8.1 Piping Materials: Piping materials shall be as per applicable criteria but may be restricted based on specific conditions at this site. The Design/Build engineer shall determine suitability of piping materials based on soil characteristics, water quality, and other factors.

6.8.1.1 Typical Post existing construction for above ground natural gas piping is black steel, with pressure at approximately 60 psig. Gas piping shall be provided as allowed by NFPA 54.

6.8.2 Cross Connection Control: All local site specific requirements for cross connection control/backflow prevention shall be followed. All facilities will be provided with an inlet water backflow prevention device, located in a DPW-approved aboveground enclosure at least 33' from the building, and the connection point within the 5' line of the building; additionally, potable water systems shall be protected from contamination by hydronic water and other industrial and mechanical systems (see fire protection codes and this RFP for backflow prevention for those systems) via a reduced pressure zone backflow preventer. The D/B Contractor is responsible for installing the backflow prevention device. Reference Base Utility Information paragraph under 6.4 Site Engineering.

6.8.3 Natural Gas Supply: The D/B Contractor shall normally utilize the standard gas pressure from the utility provider's building regulator or 5.3 ounces. If higher pressures are required, the D/B Contractor shall coordinate these requirements with the provider. Additionally, the D/B Building Contractor shall coordinate his flow and pressure requirements with the DPW. Unless directed otherwise, the D/B Contractor shall report no diversity- that is all loads are firing at the same time.

6.8.3.1 Natural gas meters shall have Lonworks compatible output for connection to the building DDC system.

6.8.4 Water and Sanitary Sewer Service Utility Provider Coordination: Reference Base Utility Information paragraph under 6.4 Site Engineering.

6.8.4.1 Water meters shall have Lonworks compatible output for connection to the building DDC system.

6.8.5 Equipment Pads: On-grade mounted equipment shall be elevated on 6 inch thick concrete pads to prevent accumulation of water and metal corrosion.

6.8.6 Exterior Water Piping Freeze Protection: Seasonally (not used in winter) utilized water supply piping shall detailed and installed for complete drain down and shall be provided with an interior or below grade isolation valve. Exposed water piping that is utilized year round shall be insulated and heat traced and protected with pipe jacketing to ensure that the piping will not freeze.

6.8.7 Janitor's Closets: In janitor's closets provide at minimum a floor drain and a service/janitorial sink.

6.8.8 Stop Valves For Specific Equipment Domestic Water Supply: Stop valves shall be provided for all plumbing fixtures, including refrigerators and ice makers and shall be ball valves.

6.8.9 Fixture Faucet Mixing Valve, Other Valve and Plumbing Materials and Equipment: Latrines and toilets with multiple lavatories shall be equipped with hands free type faucets. For private toilet lavatories and sink fixtures with manual single handle type mixing faucet valves, provide seals and seats combined into one replaceable cartridge; the cartridge shall be designed to be interchangeable between lavatories or provide replaceable seals and seats that are removable either as a seat insert or as a part of a replaceable valve unit.

Shower valves shall be the automatic mixing type with anti-scald temperature control and shall be pressure balancing/compensating type. Valves shall not have any internal or exterior plastic parts.

6.8.10 Water Hammer Arrestors: The D/B Contractor shall provide water hammer arrestors as required by code.

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.9.1 Electrical Service: Site power drawings (ES-102) showing the connection from BTC2 to the existing grid have been provided for informational use only in Appendix FF. Primary electrical service is TBD and to be coordinated by the D/B Contractor with USACE and the Installation. An arial image of the future location of the new substation has also been provided in Appendix FF. A transformer shall be placed at a minimum of 33 feet from the buildings. The transformer shall have a minimum clearance about its perimeter of 10 feet. Provide underground conduits with 25% spare capacity from secondary side of service transformer to each building. At the D/B Contractor's option, and with approval from DPW, one service transformer may feed multiple buildings. Coordinate with the BNHQ contractor for location of the BNHQ D/B Contractor provided BNHQ transformer. Provide a minimum amount of cable to reach the BNHQ transformer location plus an additional 20 feet.

6.9.2 Exterior Lighting: Site lighting within the designated complex construction area shall be designed and installed by D/B Contractor. Light poles shall be placed on concrete bases and at a height where maintenance can be easily achieved. General site lighting shall be controlled via photocells. Site lighting for the track and PT areas shall be controlled via a timer switch with a two-hour maximum time limit. In addition to the barracks, training, and other general areas within the BCOF, the D/B Contractor is also responsible for providing matching lighting in the area around the BNHQ. The BNHQ Contractor shall provide a maximum of two 30A (maximum) circuits at a handhole at the 5' perimeter line of the BNHQ for the D/B Contractor to connect to. The D/B Contractor shall be responsible for controls of this lighting as well. The area to be fed from the BNHQ panelboard is shown in Appendix HH. The D/B Contractor shall coordinate with the BNHQ Contractor for necessary overcurrent protection and wire sizing.

6.9.3 Exterior Mass Notification: Provide one centralized pole mounted loud speaker(s) audible and intelligible to the entire outdoor complex.

6.9.4 Exterior Telecommunications: The D/B Contractor is responsible for bringing telecommunications service from the telecommunications building at the intersection of Golden Arrow Rd and Dixie Rd. The Contractor shall provide a 900 pair minimum voice grade copper cable and a 24 strand minimum singlemode fiber optic cable to the complex. The Contractor shall, at the permission of the DPW, utilize existing duct bank from Dixie Rd to the nearest manhole (M15) at BTC2 and extend from this point to the BCT3 complex. A site utility drawing showing the proposed manhole and duct bank layout for BTC2 has been provided in Appendix FF. From the primary communications manhole at the incoming duct bank location near the BNHQ, the Contractor shall provide a communications duct bank distribution system with a minimum of four 4 inch ducts to each facility. Any spare ducts shall utilize a mesh type inner duct material. All new manholes shall have lockable covers. The Contractor shall provide and coordinate with the BNHQ Contractor the location of the duct bank connection point for the BNHQ service at the 5' perimeter line of the building nearest to the BNHQ telecommunications room on the south side of the BNHQ.

The D/B Contractor shall provide a 200 pair voice grade copper cable to the 5' perimeter line of the BNHQ with an additional 50' of cable for the BNHQ contractor to extend into the BNHQ main telecommunications room. The 200 pair voice grade cable for the BNHQ shall be spliced from the 900 pair voice grade copper cable coming into the complex from the telecommunications building at Dixie Rd and Golden Arrow Rd. The D/B Contractor shall provide a minimum 100 pair voice grade copper cabling to each barracks telecommunications room. Splices shall be located within the primary communications manhole near the BNHQ. Additionally the D/B Contractor shall extend a four 4"C duct bank to a handhole on the east side of the BNHQ for the Phase 2 contractor to connect to. The D/B Contractor shall include adequate room within the primary communications manhole for the Phase 2 Contractor to splice his cables to the incoming 900 pair voice grade copper cable.

The D/B Contractor shall provide a 24 strand minimum singlemode fiber optic cable from the telecommunications building at the intersection of Golden Arrow Rd. and Dixie Rd. to the 5' perimeter line of the BNHQ with an additional 50' of cable for the BNHQ Contractor to extend into the BNHQ main telecommunications room. The D/B Contractor shall extend a 12 strand singlemode fiber optic cable from each B/COF facility to the 5' perimeter of the BNHQ, each with an additional 50' of cable for the BNHQ Contractor to extend into the main telecommunications room.

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

Provide a new addressable fire alarm system as prescribed by the most current version of UFC 3-600-01, NFPA 101 and installed IAW NFPA 72 to include a Mass Notification System per UFC 4-021-01- Mass Notification

Systems. Provide a separate Public Address (PA) System. The Authority Having Jurisdiction (AHJ) requires the following to meet the local requirements for installation of fire alarm systems:

6.10.1 Mass Notification: Mass notification system (MNS) shall be compatible and integrated into the Installation's existing Giant Voice system. Existing Giant Voice is a radio system consisting of both Wheelock and ATI components. New system shall be trunking capable and separate from the PA System. The MNS shall be equipped with Local Operating Consoles (LOC) and shall be design IAW the latest version of UFC 4-021-01. POC Information: ATO Mark Mallach (803) 751-2132, mark.mallach@us.army.mil.

6.10.1.1 The pre-programmed MNS audible announcement messages shall be as follows:

Female voice will be used.

1 "Attention. Your attention please. The fire alarm in the building has been activated. Cease operations immediately. Proceed to the nearest exit and leave the building. Do not use the elevator". (repeat 3 times)

2 "Attention. Your attention please. This is a tornado warning. Please seek shelter in an interior room and stay out of hallways and away from exterior windows". (repeat 3 times)

3 "Attention. Your attention please. The National Weather Service has issued a severe thunderstorm warning for our area. (repeat 3 times)

4 "Attention, attention. A bomb threat alert has been issued for this building. All personnel are to evacuate immediately using the nearest exit. Further instructions will be issued outside the building by emergency response teams." (repeat 3 times)

5 "Attention. Your attention please. A hazardous material danger exists in the area. Remain in the building. Please keep all doors and windows closed. Please wait for further instructions from Emergency services. (repeat 3 times)

6 "May I have your attention, please. All clear. The emergency has ended." (repeat 3 times)

7 "Attention. Your attention please. This is a test of the emergency audio system".

8 "Attention. Your attention please. An active shooter danger exists in the area. Remain in the building and proceed to a room that all doors and windows can be locked. Lie flat on the floor so no one is visible from outside the room. Call 9-1-1 to report your location. Do not respond to any voice commands until you can verify they are from Emergency services. (repeat 3 times)

6.10.2 Fire Alarm System: Existing local receiving system is the Monaco BT-X with narrow band technology. Provide an addressable Fire Alarm Control Panel (FACP). The fire alarm system shall meet Fort Jackson's 911 Center configuration requirements for interconnection to the fire alarm receiver. Equipment supplied shall be fully compatible with the central facility equipment. Provide ductwork smoke detectors, self resetting type and for use in high humidity, and labeled for easy location with remote test indicator at each detector. The Contractor shall specify maintenance accessibility for initiating devices to include duct detectors that is acceptable to the local fire alarm technician. No fire alarm remote annunciator is required. All conduit shall be painted with a red stripe every 10 feet or provide conduit that is solid red, as determined by the AHJ. The FACP shall be located in a conditioned space with direct access to the outside, as determined by the AHJ. All devices shall be labeled by FACP address. Locking devices shall be red. Mount FACP panel and Monaco BT-X side by side with the top of the enclosures no higher than 5'-8". Lockable circuit breakers shall be provided for the FACP. Fire alarm zoning must also be done in accordance with local AHJ guidance. Provide training to Fort Jackson fire department personnel and to the local fire alarm technician on the FACP. Training shall be conducted at Fort Jackson. Provide lockable circuit breakers for the FACP. Coordinate with Fort Jackson's Directorate of Emergency Services for specific Installation requirements. POC Information: Assistant Chief Scott Dollman (803) 751-1614 scott.dollman@us.army.mil, Inspector Peter Hines (803) 751-1611 peter.hines@us.army.mil, Inspector Jamal Black (803) 751-5239 jamal.black@us.army.mil, or Inspector Gino Sita (803) 751-1610 aniello.sita@us.army.mil.

6.10.2.1 Provide necessary documentation (including rights to documentation and data), configuration information, configuration tools, programs, drivers, equipment specific interfacing cable and other software shall be licensed to

and otherwise remain with the Government such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor.

6.10.2.2 Provide a full sized set of the fire alarm system 'as-built plans' directly to the local fire alarm technician.

6.10.3 Knox Box: The secure box specified in paragraph 3.4.1.1 shall be provided with an alarm tamper switch. The alarm switch shall be monitored by the FACP as a trouble alarm.

6.10.4 Cable Television (CATV): All horizontal cables shall be terminated on patch panels in the telecommunications rooms.

6.10.5 Receptacle covers: Provide and install heavy-duty receptacle covers.

6.10.6 Additional Requirements

6.10.6.1 The Intrusion Detection System (IDS) specified in paragraph 3.7.6 shall be ICIDS-3 compatible and tied into the monitor point at the MP Station (located at Building 5499). Provide one dedicated phone line and one dedicated 30 amp breaker.

6.10.6.2 Dryers specified in paragraph 3.2.2.2(e) will be electric. Provide power receptacles for electric dryers.

6.10.6.3 Corrections to Paragraph 3:

(a) Replace paragraph 3.7.1.3 with the following revised paragraph 3.7.1.3: "For housekeeping purposes provide a minimum of one 125-volt, duplex receptacle per corridor and a minimum of one 125-volt duplex receptacle on each wall within the lobby. No point along bottom of corridor or lobby walls shall be more than 25 feet from a receptacle."

(b) Replace paragraph 3.7.3 with the following revised paragraph 3.7.3: "Interior lighting controls shall be provided in accordance with ASHRAE 90.1. Compact fluorescent lamps of 12 watts or less shall not be used. Electronic ballast for linear fluorescent lamps shall be the high efficiency programmed start type. Provided lighting levels shall be within +/- 10% of required lighting levels."

(c) Replace paragraph 3.7.3.1(b) with the following revised paragraph 3.7.3.1(b): "An un-switched fixture with emergency ballast shall be provided at the entrance to each arms vault. Fixture shall be vandal resistant."

(d) Replace paragraph 3.7.5 with the following revised paragraph 3.7.5: "Provide a dual (fiber optic and 8-pin modular) jack outlet for video conferencing connectivity in each classroom."

(e) Replace paragraph 3.7.6.1 with the following revised paragraph 3.7.6.1: "Infrastructure for an Intrusion Detection System (IDS) shall be provided for each arms vault. Infrastructure shall consist of conduit, pull wire and outlet boxes. Outlet boxes are required for a control panel, balanced magnetic switch, motion sensor, and duress switch unless specified otherwise in paragraph 6.10. System requirements shall be coordinated with the Installation."

(f) Replace paragraph 3.7.8 with the following revised paragraph 3.7.8: "Mass notification system shall be provided in accordance with UFC 4-021-01."

(g) Add the following paragraph 3.7.11 Security Infrastructure (Security Equipment Not in Contract): "The security infrastructure shall be installed to support GFGI cameras (fourteen total). Cameras will be placed underneath the covered training areas to monitor the two doors leading into the stairwells, the two doors (utilizing one camera) leading into the queuing corridor and the door leading into the Reception/CQ area. In addition, cameras will be used to monitor both entrances into the sleeping bays and the main entrance into the building (camera to be placed outside to monitor main entrance). Provide an additional camera outside the arms vault identified in paragraph 3.2.1.1(I). Infrastructure shall consist of 1-inch conduit, pull wire and outlet boxes. Conduits shall homerun from camera location outlet boxes to back of the luggage storage room located closest to the CQ desk. This is where an equipment rack for GFGI monitoring equipment will be located. Provide a 2-inch conduit through the wall to provide pathway between the monitoring equipment and the CQ desk."

(h) Replace paragraph 3.7.12 with the following revised paragraph 3.7.12: "A door monitoring system consisting of a door status/alarm panel and door balanced magnetic switches shall be provided. The monitoring system shall provide door status/alarms on all doors leading into and within sleeping bays in order to accommodate gender segregation. System shall allow each door alarm to be individually activated or deactivated. A door status/alarm panel that monitors all doors shall be located in the reception area near the CQ workstation. In addition, each Drill Instructor office (four total) shall have a door status/alarm panel that monitors only those doors associated with the adjacent sleeping bay. Panel shall provide both an audio and visual signal when alarm is activated."

(i) Revise paragraph 3.8 FIRE ALARM REQUIREMENTS to read as follows:

"3.8.1 All software, software locks, special tools and any other proprietary equipment required to maintain, add devices to or delete devices from the system, or test the Fire Alarm system shall become property of the Government and be furnished to the Contracting Officer's Representative prior to final inspection of the system.

3.8.2 The fire alarm system installation shall be supervised by a National Institute for Certification of Engineering Technologies (NICET) 3 (minimum) technician.

3.8.3 Smoke detectors shall be provided in all sleeping bays. Smoke detectors in bedrooms shall be monitored. Tampering with a smoke detector shall send a trouble signal. Trouble signals shall be transmitted to the fire department."

6.10.7 The D/B Contractor shall be responsible for extending copper and fiber cables into each B/COF and providing the necessary splices, surge protection, terminations, and cross-connections. The BNHQ Contractor, under a separate contract, will provide space allocation for fiber optic cable splices and terminations within the main BNHQ telecommunications room.

6.10.8 See paragraph 3.7.4 for facility telecommunications requirements.

6.11. HEATING, VENTILATING, AND AIR CONDITIONING

6.11.1 General Design Requirements: HVAC systems shall be designed to meet the requirements of the RFP reference documents, the International Mechanical Code, applicable NFPA Standards, and UFC 4-010-01. In addition, the HVAC design shall meet the LEED Silver rating and incorporate energy conservation strategies and design techniques to meet the Silver Rating. It is paramount that the systems provided be as simple and low maintenance as possible yet meet the higher energy efficiency requirements for a LEED Silver installation. In addition, mechanical and HVAC systems shall be designed for durability. Stand alone facilities shall be designed for this facility. Maintenance staffing and capabilities are limited therefore simple yet durable mechanical systems are required.

6.11.1.1 Stand-alone heating shall be provided for each of the facilities. Stand-alone heating shall be by low temperature hot water using condensing boilers and heating water supply temperature of no greater than 140 deg F.

6.11.1.2 Cooling shall use chilled water serving 4-pipe fan coils and air handlers. Fan coils and air handlers shall be selected based on 48 deg F chilled water supply and a minimum 12 deg F delta T. The chilled water system shall incorporate piping stubouts to include full-size tees and blind flanges for future connection to a Central Energy Plant distribution system. Provide concrete valve pits outside each building for the future distribution piping connections.

6.11.1.3 Stand-alone air-cooled chillers for each building shall be a bid option. Piping stubouts to include full-size tees and blind flanges for future connection to a Central Energy Plant distribution system shall also be installed if the air-cooled chiller bid option is accepted. Provide concrete valve pits outside each building for the future distribution piping connections.

6.11.1.4 The chilled water system shall not apply to the required Dedicated Outdoor Air Unit (DOAU) which shall be stand-alone DX with condenser heat recovery reheat and exhaust air heat recovery.

6.11.1.5 Equipment Pads: On-grade mounted equipment shall be elevated on 6 inch thick concrete pads to prevent accumulation of water and metal corrosion.

6.11.2 Emission Control Requirements for Air Conditioning Units and Chillers: Class I and Class II ozone depleting chemicals ODCs (as listed at 40 CFR 82) shall be eliminated during and after construction by using alternative environmentally preferable products. Chillers shall have high efficiency for cooling system that decrease utility-generated greenhouse gas emissions, create low emissions, and are ODC-free (e.g., use R-123, R-134a).

6.11.3 Underground chilled water piping shall be factory insulated HDPE pipe.

6.11.4 Controls: HVAC controls shall be provided and installed for full integration into the existing Postwide HVAC control system (which is a TAC system). Control systems for all facilities in the RFP shall be provided so that Fort Jackson can monitor and control the new building from this remote location without Fort Jackson having to add any equipment to make the existing and new systems interface. Controls shall have open protocol, have interoperable capabilities and come with one year unconditional warranty for the installed building automation system and on all service call work. Warranty shall include labor and material necessary to restore the equipment involved in the initial service call to a fully operable condition.

(a) Temperature and humidity shall be controlled to provide comfort for the occupants and to also maintain humidity levels between 35% and 50% to prevent mold formation in the building. Sizing equipment shall be based on the greater cooling load calculated at the design dry bulb temperature condition or at the design humidity condition whichever is greater. Over sizing equipment shall be avoided and the design shall include control strategies to maintain temperature and humidity levels during part load conditions and unoccupied conditions. Disregard the oversizing of equipment as described in paragraph 5.8.2.3. Outdoor air shall be controlled to ensure adequate ventilation and to ensure slightly positive overall building pressurization at all times. Outdoor air shall be monitored using low maintenance/no maintenance air flow measuring stations.

(b) Controls shall continuously monitor, control and provide adequate feedback on the status of outdoor air, exhaust fans, air handlers, air temperatures, chilled and hot water temperatures, chilled and hot water flow rates, humidity levels for each area controlled by an air handling unit, etc. Controls shall provide enough information to allow maintenance staffing to proactively maintain the mechanical systems and trend information on all systems. For example the controls will monitor air filter loading on primary and secondary air filters. When set points go out of range from set parameters the controls shall alarm and alert personnel to the condition.

6.11.5 Telecommunications Rooms: Telecommunication equipment rooms shall be air conditioned to space comfort conditions as per applicable criteria, by dedicated, separate year round direct expansion cooling and heating systems. Environmental requirements for telecommunication rooms shall be in accordance with TIA-569-B/TIA-B-1.

6.11.6 Heating and Ventilation for Mechanical Rooms and Other Service, Storage and Utility Spaces: Mechanical, fire protection, electrical, and storage spaces shall be automatically ventilated to limit space temperatures to 10 degrees F above design outside air temperature. Additionally, mechanical and fire protection and other space containing piping or liquids, including chilled and heating hot water, shall be minimally heated for freeze protection.

6.11.7 UTILITY MONITORING AND CONTROL SYSTEM (UMCS)

6.11.7.1 UMCS: Fort Jackson has a central UMCS. It is a TAC "Vista" LonWorks UMCS, which is open and is as per Par 5.8.3. All bldg controls and controls integration to UMCS specified in the RFP need to conform with Par 5.8.3. All new buildings and new building systems shall be connected to the TAC "Vista" UMCS only. The connection method is via LAN. The D/B Contractor shall coordinate with the Fort Jackson NEC to obtain a static IP address and to get their construction requirements (crossover mechanical/electrical). Utility meters shall be LonWorks. Coordinate UMCS requirements with Wayne Catoe at (803) 751-1738.

6.11.7.2 Mechanical building equipment and HVAC controls systems shall be connected to UMCS, including but not limited to air handlers, makeup air units, pumps, chillers, boilers, cooling equipment, including unitary equipment.

6.11.7.3 Monitoring and Control hardware and software requirements are listed below. Each list is provisional and will depend on selected HVAC systems for actual points being monitored and controlled and applicable software:

(a) Standard Input/Output (I/O) points, to be connected and integrated for monitoring and control will need alarm limits, etc. as appropriate for all I/O:

Outside Temperature (F)

Outside Humidity (%)

Boiler Safeties (All)

Chiller Safeties (All)

Air Handler Safeties (Freezestats, Firestats, etc.)

Air Flow Monitor (normal/low)

Start/Stop Monitor (normal/low)

Air Handler Hot Deck (F)

Air Handler Cold Deck (F)

Return Air Temperature (F)

Mixed Air Temperature (F)

Supply Temperature for each Zone or Main Supply Temp (F), etc.

Room Air Temperature for each Zone (F)

Humidity for each Zone (%)

Chilled Water Supply (F)

Chilled Water Return (F)

Chilled Water Flow (GPM)

Chiller Start/Stop Control and Load Limiting Input/

Chilled Water Pump Status (on/off)

Economizer Control

Hot Water Pump Status (on/off)

Hot Water Supply & Return Temperatures (F)

Hot Water Flow (GPM)

Filter Media Differential Pressure Alarms

Motor Run Time (elapsed)

Moisture Alarms in Raised Floor Areas

CO2 Sensors

Enable/Disable

Start/Stop

Run-longer user interface (usually 2 hours) to delay unoccupied modes

Emergency HVAC Shutdown Switch Alarm

(b) Standard Monitoring and Control Software that will be provided, both at the building or be integrated into or used at the existing UMCS are:

High and low temperature limit alarming

High and low humidity limit alarming

Equipment runtime and status (on/off, enabled, etc.)

Scheduled and optimum start/stop

Duty cycling

Demand limiting (motor start/stop restrictions, motor size, etc.)

Occupied/Unoccupied

Time Scheduling

Day/Night Setback

Economizer

Ventilation and Recirculation, Vent Delay, etc.

Hot and Cold deck reset

Reheat coil reset

Boiler plant - boiler optimization

Chiller plant - chiller optimization

Heating water supply temperature reset

Chilled water supply temperature reset

Post-wide demand limiting

6.11.7.4 Integration of new facilities into the existing UMCS database and monitoring and controls software (such as the post wide demand limiting) shall require generation of custom graphics matching the style and complexity of the existing graphics. Integration of new facilities shall also include programming of alarm handling and demand load limiting which will require DPW input for critical alarm lists and priority of facility for demand load limiting. This shall be done at the TAC Vista UMCS "front-end".

6.11.7.5 Detailed Submission, Documentation, Equipment and Requirements for UMCS Integration of Facility Controls and Equipment:

6.11.7.5.1 Controller Data: Reported Data out of controllers shall be fully exposed to a TAC Vista variable with a standard variable type.

6.11.7.5.2 Output and Input Visibility: All outputs shall be fully visible (TAC Vista variable) including all Analog Inputs and Outputs (AI and AO) and Digital Inputs and Outputs (DI and DO).

6.11.7.5.3 Inputs to Programmable Controllers: Inputs to programmable controllers shall be fully exposed and visible and adjustable via TAC Vista.

6.11.7.5.4 Definition of Internal Variables: Provide a complete list and definition of all internal variables such as economizer on/off point; provided the proprietary name, address, explanation of what the variable is and does, etc.

6.11.7.5.5 Exposure of Alarms: All alarm conditions must be fully exposed.

6.11.7.5.6 For Manual Control Override: For manual control override of building controls provide a logical switch for which the switching input is open and controllable and one side of the switch is open to external input for control (such as occupancy command).

6.11.7.5.7 For Override of Building Controls Time Schedule: Provide the same type of logic override input for the UMCS as described above for manual control override.

6.11.7.5.8 Building Controls Interface: The D/B Contractor shall provide a building controls interfacing personal computer (PC) for each unique building or set of unique type buildings. The computer will serve as the service PC and shall contain all of the control and service software for programming, troubleshooting and operating the building controls system and shall allow updating of local controls setpoints or ranges, etc if the need arises.

6.11.7.5.9 Definition and Detailed Listing (spreadsheet) of all Points: The building controls contractor shall provide a complete and comprehensive listing of all points, grouped by controls system or piece of equipment that lists (at minimum) for each item: controller node number, proprietary point name, description of actual usage in common terms, SNVT type, point type (AI, etc.), function, point number, Controller IP address, etc. This listing shall include even internal control points, trending points, etc.

6.11.8 Water Quality Analysis and Treatment: D/B Contractor shall coordinate with water treatment contractor to confirm water data and current water treatment methods to obtain the required quantity and types of chemicals to be initially introduced into the closed loop heating and chilled water systems if used. Treatment will be required for use as make-up water in HVAC equipment. Water Quality tests shall be performed by the D/B Contractor. The D/B

Contractor shall analyze the hardness element of the water and provide water softening, if necessary. As a minimum, the following data shall be determined:

Chlorides: ____ ppm

Total Alkalinity: ____ ppm

Total Hardness: ____ ppm (CaCO₃)

ph: ____

Silica: ____ ppm (SiO₂)

Iron: ____ Reactive (this is leaving the plant)

Total Dissolved Solids: ____ ppm

Preliminary data indicates:

Total Hardness: 130 ppm (CaCO₃)

ph: 7.6

Total Dissolved Solids: 320 ppm

6.11.9 HVAC Security: Security requirements for HVAC (duct bars, etc. as necessary) shall follow Army Regulation 190-51 for areas such as arms rooms, vaults, etc.

6.11.10 Roof mounted HVAC equipment is considered undesirable; however, if it is to be provided by the D/B Contractor, the D/B Contractor shall provide proper permanent ladders, roof protecting walking surface and adequately large OSHA approved work surfaces around each device or piece of equipment; see architectural requirements.

6.11.12 Screening for mechanical and electrical equipment should be used to block undesirable views. The D/B Contractor shall design the screening to be compatible with the exterior of the adjacent facilities. Screening shall comply with UFC 4-010-01.

6.11.13 Air Filters: The D/B Contractor shall provide disposable filters for fan coil units and disposable type for air handlers, makeup air units, variable air volume boxes, etc.

6.11.14 Mechanical ATEP Requirements: Mechanical design shall comply with the requirements of UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings.

6.11.14.1 All outside air intakes shall be a minimum of 10 feet above the ground.

6.11.14.2 Provide an Emergency HVAC Shutdown Switch that will immediately shutdown the air distribution system in the building. All outside air, relief air, and exhaust dampers shall close. Locate switch to be easily accessible by building occupants. The DDC controls shall monitor switch and send alarm to UMCS if activated.

6.11.14.3 Mount all overhead utilities and other fixtures weighing 14 kilograms (31 pounds) or more (excluding distributed systems such as piping networks that collectively exceed that weight) to minimize the likelihood that they will fall and injure building occupants. Design all equipment mountings to resist forces of 0.5 times the equipment weight in any horizontal direction and 1.5 times the equipment weight in the downward direction. This standard does not preclude the need to design equipment mountings for forces required by other criteria such as seismic standards.

Integrate the control system to the installation's existing UMCS. The existing UMCS is TAC VISTA.

6.12. ENERGY CONSERVATION

6.12.1. General

6.12.1 No additional Requirements.

6.12.2. Inclusion of Renewable Energy Features. The following renewable energy features have been determined lifecycle cost effective, are included in the project budget and shall be provided:

There are no additional requirements.

6.13. FIRE PROTECTION

6.13.1 HVAC Equipment Restart: When a fire alarm shut-down is cleared at fire alarm panel, affected mechanical equipment shall automatically restart.

6.13.2 Riser Location: Fire risers shall be installed in dedicated space or mechanical room with external access for fire department.

6.13.3 Post Indicator Valve (PIV) and Fire Department Connection (FDC): The PIV and FDC for the building fire sprinkler will be provided by the D/B Contractor and located outside of the building or on the building (through-the-wall type). The PIV shall also be electronically monitored by the fire alarm control panel. Provide FDC signage IAW NFPA 13. Automatic sprinkler system valves shall be electronically supervised by the FACP, to include the PIV.

6.13.4 Fire Sprinkler Seismic Design: Fire sprinkler systems shall be designed for protection of piping against damage from earthquakes as per NFPA 13.

6.13.5 Fire Sprinkler Backflow Prevention: Backflow prevention shall be as per state and local cross-connection control requirements. At Fort Jackson, all backflow preventers shall be installed outside, 33 feet away from the facility. All shut-off valves shall have tamper switches monitored by the fire alarm.

6.13.6 Sprinkler systems must comply with the current versions of both NFPA 13 and UFC 3-600-01. Hydraulic calculations shall be based on UFC 3-600-01, Table 4-1. Refer to paragraph 5.10.5 for requirements of design engineer. If steel piping is used, piping thickness shall be schedule 40 minimum.

6.13.6.1 Water Supply: Refer to Appendix D for fire flow test data. See paragraph 6.4 for the site work installation of the water supply line and pump station. The water supply system will be capable of providing required water volume and pressure for the wet-pipe system. The Contractor shall be required to perform a flow test at completion of water system installation.

6.13.6.2 Provide a wet-pipe fire sprinkler system in accordance with UFC 3-600-01, and NFPA 13. All interior areas of the building will be protected by the wet-pipe system. The sprinkler hazard classifications shall be in accordance with UFC 3-600-01, and NFPA 13. Design densities, design areas and exterior hose streams shall be in accordance with UFC 3-600-01. The covered training areas on the ground floor shall be protected by a dry pipe system with pendent sprinklers. Where steel pipe is to be used for sprinkler piping, it shall be a minimum of Schedule 40- do not use Schedule 10 steel piping.

6.13.7 Manual Standpipe: Provide a minimum of one Class I manual standpipe in each stairwell in accordance with NFPA 14. Provide 2 ½ inch hose connections at each floor. Hose is not required. Standpipe hose connections shall be located on the first floor and at intermediate landings IAW NFPA 14. Standpipe shall be minimum 4 inches in diameter. Locate Fire Department Connection at an accessible location by central stair.

6.13.8 Fire Alarm System: There shall be one complete fire alarm system for each building. This system shall consist of a fire alarm panel, a RF transceiver, initiating devices and notification devices. Pull stations shall be single-action, non-glass rod type. Provide pull station covers to all pull stations to reduce accidental alarms, as determined by the AHJ. No audible horn is required on the covers. Class A addressable systems shall be installed. The fire alarm system shall be designed by a professional Fire Protection Engineer or NICET Level IV. The installation of the fire alarm system shall be managed by a NICET Level III fire alarm system qualified technician. The technician shall be factory trained and certified for fire alarm system installation and emergency communications system installation of the specific type and brand of system and who are acceptable to the AHJ. Technician shall comply with the requirements of UFC 3-600-01. See paragraph 6.10.2 for additional fire alarm requirements.

6.13.9 The RF transceiver shall be compatible with the fire department's receiving system, operating on a RF frequency and shall be coordinated with the fire alarm technician. See paragraph 6.10.2 for POC Information.

6.13.10 Smoke Detectors: Provide photoelectric smoke detectors with 2.5% obscuration, pigtails for permanent connections, continuous power indicator light, test button and metal base. Smoke detectors shall be capable of smoke verification and equipped with sounder bases, where required. The sounder bases shall be monitored by the facility fire alarm control panels. When activated these devices will send a trouble alarm to the fire alarm control panel and will not generate a general building alarm.

6.13.11 All software, software locks, special tools and any other proprietary equipment required to maintain, add devices to or delete devices from, the system, or test the fire alarm system shall become the property of the Government and furnished to the COR prior to the final inspection of the system.

6.13.12 Provide maintenance accessibility for initiating devices to include duct detectors. Use duct detectors that are self resetting and for use in high humidity, with remote test indicator at each detector.

6.14. SUSTAINABLE DESIGN

6.14.1. LEED Rating Tool Version. This project shall be executed using LEED-NC Version 3.

6.14.2. The minimum requirement for this project is to achieve LEED Silver level. Each non-exempt facility (building plus sitework) must achieve this level. In addition to any facilities indicated as exempt in paragraph 3, the following facilities are exempt from the minimum LEED achievement requirement: Lawn Equipment Building.

6.14.3. Credit Validation: LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the Contractor. Administration/team management of the online project will be by the Contractor. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with the GBCI and the Contractor will furnish audit data as requested at no additional cost.

6.14.4. Commissioning: See Appendix M for Owner's Project Requirements document(s).

6.14.5. LEED Credits Coordination. The following information is provided relative to Sustainable Sites and other credits.

SS Credit 1 Site Selection:

Project site IS NOT considered prime farmland.

Delineation of 100-year flood elevation is shown on site drawings provided in this CONTRACT.

Delineation of threatened or endangered species habitat is shown on site drawings provided in this CONTRACT.

Delineation of water, wetlands and areas of special concern is shown on site drawings provided in this CONTRACT.

Project site WAS NOT previously used as public parkland.

SS Credit 2 Development Density & Community Connectivity.

Project site DOES NOT meets the criteria for this credit.

SS Credit 3 Brownfield Redevelopment.

Project site DOES NOT meets the criteria for this credit.

SS Credit 4.1 Public Transportation Access.

Project site DOES NOT meets the criteria for this credit.

EA Credit 6 Green Power.

35% of the project's electricity WILL NOT will be provided through an Installation renewable energy contract. Do not purchase Renewable Energy Credits (REC's) to earn this credit.

MR Credit 2 Construction Waste Management.

The Installation does not have an on-post recycling facility available for Contractor's use.

Regional Priority Credits (Version 3 only)

The project zip code is 29207.

6.14.6. LEED Credit Preferences, Guidance and Resources. See Appendix L LEED Project Credit Guidance for supplemental information relating to individual credits.

6.14.7. Not Used

6.14.8. Additional Information

There is no additional information.

6.15. ENVIRONMENTAL

The D/B Contractor shall comply with all Federal, State, and Local environmental requirements.

6.15.1 See Appendix E for more information and requirements.

6.15.2 The Notice of Termination that is to be completed after construction (see SECTION 015723 - TEMPORARY STORM WATER POLLUTION CONTROL, paragraph 1.3.2(e)10) shall be sent to the Contracting Officer's Representative and the Fire Department in lieu of the instruction provided in SECTION 015723. The Contracting Officer's Representative shall be responsible for notifying the State Regulatory Agency and the National Response Center.

6.15.3 If the Erosion Control measures result in the collection of waste materials, the D/B Contractor shall be responsible for storing, transporting, and disposing of the waste in accordance with SCDHEC and DOT regulations. If the waste meets the criteria of a hazardous waste, the Hazardous Waste Manifest must list Fort Jackson's EPA ID number in Block 1, Fort Jackson's Environmental Division name, address, and phone number in Block 5, and it must be signed by Barbara Williams, Fort Jackson Environmental Division in Block 15. The Land Disposal Restriction Form must also be signed by Barbara Williams, Fort Jackson Environmental Division.

6.15.4 The SWPPP shall meet the requirements of the SCDHEC's 2006 General Permit for Storm Water Discharges from Large and Small Construction Activities.

6.15.5 Copies of all Monthly Reports submitted to SCDHEC and weekly inspection reports shall be provided to the Fort Jackson Environmental Division - Storm Water. Contact Matt Holstein at 803-751-9504 to coordinate the submission of these copies.

6.16. PERMITS

Obtaining permits shall be a joint responsibility of the D/B Contractor and the other Contractors adjacent to this project site. The D/B Contractor shall be responsible for obtaining all applicable permits (local, state, and federal) as part of the design process and shall secure all permits necessary for construction of this project within the designated construction limits. Other Contractors, responsible for work adjacent to this project site, will be responsible for any site utility related permits and other local, state, and federal permits outside the designated building area limits of this project. The Government will not obtain any permits for this project.

6.16.1 The D/B Contractor shall obtain all needed permits or licenses. The Government will not obtain any permits for this project. All permit preparers must be registered / qualified in the state of South Carolina. The D/B Contractor shall be responsible for obtaining all applicable permits as part of the design process and shall secure all permits necessary for the construction of this project. The D/B Contractor is required to pay all permitting fees and fines associated with this project, at no additional expense to the Government. The D/B Contractor is responsible for complying with all local, State and Federal regulatory requirements.

6.16.2 NOTICE OF INTENT (NOI) REQUIREMENTS. The NOI for Storm Water Runoff from Construction Activities, and all fees required, shall be filed by the D/B Contractor prior to construction start. The D/B Contractor shall be responsible for all requirements of the permit, to include signing the NOI, development of the Storm Water Pollution Prevention Plan, submitting the NOI and annual fee, required inspections, obtaining Contractor certifications, maintaining on-site files, submitting the Notice of Termination, etc. The D/B Contractor shall provide copies of all documents submitted concurrent with their submittal. A copy of the permit shall be provided to the Government. The D/B Contractor shall be responsible for payment of the required \$125.00 permit fee.

6.16.3 DUST PERMIT. The D/B Contractor is required to prepare and follow a Fugitive Dust Control Plan (FDCP). The FDCP shall include dust suppression techniques, such as wetting exposed soil, to prevent the generation of dust.

6.16.4 SOIL EROSION. The proposed facilities and associated parking will disturb more than one acre. Therefore, a Soil Erosion Control Plan (SECP) shall be developed by the D/B Contractor. Federal storm water regulations require that a SECP be followed when excavation, construction and/or ground disturbance activities associated with the construction of a new facility affects more than one acre.

6.16.5 An Installation digging permit is required.

6.16.6 NPDES Construction Permit is required.

6.16.7 Air Quality Permit is required.

6.16.7.1 Boilers must be under 10 MBTU.

6.16.7.2 No diesel generators are permitted.

6.16.7.3 The D/B Contractor shall be responsible for coordinating with Fort Jackson's Environmental Management Division (EMD) staff in obtaining all required and applicable permits as part of the design process and shall secure all permits necessary for construction of this project. Fort Jackson operates under a Title V Air Permit for air quality requirements, and the contractor is required to perform a regulatory review of all air sources in the project and submit for approval to the EMD. Each Congressional Appropriation is defined as one project. Additionally, new sources must be reviewed for NESHAP (National Emissions Standards for Hazardous Air Pollutants) applicability. The D/B Contractor is required to develop required air permit application(s) and/or coordinate with EMD on any on-going permit applications. The D/B Contractor is responsible for all air permitting fees and all required permits shall be obtained prior to construction of any new sources. The D/B Contractor is responsible for complying with all State regulatory requirements for boilers fired by either natural gas or distillate oil, and insuring that the boiler(s) is included in the Installations Title V Air Permit. New boilers with an input greater than 10 million btu/hr shall meet 40 CFR Part 60, New Source Performance Standards. All new boilers shall include low NOx burners. The D/B Contractor is required to have an air permit for each type of material (i.e. concrete, rock crushing, asphalt batch plants) that will produce dust and other harmful particulates within the boundaries of the installation. The Installations Title V Air Permit cannot be changed unilaterally by the D/B Contractor, and the D/B Contractor shall coordinate any and all changes/modifications through the designated EMD staff.

6.16.7.4 Air Permit Submittal Requirements (Boilers and Domestic Water Heaters). Pursuant to satisfying requirements under the Clean Air Act, at or before the 60 percent design stage, the D/B Contractor shall submit the following to the installation's environmental office:

(1) a listing of boilers and domestic hot water heaters that will be fired by natural gas, propane, and/or fuel oil

(2) the fuel or fuels (primary and backup, if applicable) that will be utilized for each piece of equipment

(3) the quantity of each particular size

(4) the respective input firing rate. The document shall also provide a point of contact and an alternate point of contact, should the environmental office require additional information from the designer of record during the permitting process. Furthermore, two copies of the document shall also be sent to the Savannah District, one to the Project Manager for placement in Central Files, and another to the Mechanical Section.

(5) This document shall not be sent prematurely, since any increase in boiler sizing subsequent to submission of the document will require revision to the permitting process. In any event, if there is a change in equipment sizing during refinement of the design process, an updated copy of said document shall be submitted per the guidance above.

(6) Additionally, the D/B Contractor is responsible for incorporating into the design the equipment accessories required for compliance with the governing environmental laws. This includes, but is not limited to, determining the need for individual metering and the level of emissions monitoring required. The D/B Contractor's concept design narrative shall specifically address those features that will be incorporated into the boiler system design to assure compliance with the applicable environmental laws of the State.

(7) Prior to the submission of form DD 1354 Acceptance of Real Property, the D/B Contractor shall submit to EMD copies of all required Federal and/or State certifications associated with emission units, i.e. visible emissions certifications. The dates that the certifications are turned into EMD shall be noted in the remarks section of form DD 1354.

6.16.8 Water and Sewer: A permit is required for the expansion of the water and sewer distribution in accordance with the State of South Carolina's requirements.

6.16.9 Proposers shall be aware that, normally, for fast track design-build contracts, the construction permit will not have been obtained prior to award of the design-build contract. No construction associated with the building(s) housing the boiler(s) or other source(s) of contaminant can be done prior to obtaining the required permit. Generally, only the following things can be done prior to possession of the permit: clearing and grading, access roads, driveways, parking lots, underground utilities up to the 5' line of the buildings, and ancillary structures (structures not associated with housing the sources of contaminants).

6.16.10 The D/B Contractor shall be responsible for applying for and obtaining all necessary Section 404 permits. There are existing wetlands along the south side of the project complex and it is expected that utility crossings will be required. The final routing, method of crossing, and all permits required to cross the wetlands (or perform any other work within the wetlands) shall be the responsibility of the D/B Contractor.

6.17. DEMOLITION

The D/B contractor shall coordinate with the Forestry Branch for tree harvesting and remove remaining trees and stumps after tree harvesting. Prior to commencement of construction, contractor shall provide Fort Jackson Chief of Forestry Branch at least 60 days of notice for tree harvest. The D/B Contractor shall mark the limits of construction and limits of trees removal prior to the 60 days required for the Fort Jackson Forestry Branch to harvest merchantable trees.

There are no known existing structures on the site. The gravel surfaced access road to the Confidence Course is to be relocated with a new gravel surfaced access road from Golden Arrow Road prior to demolition of the existing access road. Access to the existing Confidence Course is to remain open at all times.

6.18. ADDITIONAL FACILITIES

There are no additional facilities in the contract.

End of Section 01 10 00.0005

**SECTION 01 33 00.0005
SUBMITTAL PROCEDURES
(DESIGN-BUILD TASK ORDERS)**

1.0 GENERAL

- 1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS
- 1.14. INFORMATION ONLY SUBMITTALS

1.0 GENERAL

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 33 30 apply to this task order, except as otherwise specified herein.

1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS

Upon completion of review of submittals requiring Government approval or concurrence, the Government will stamp and date the submittals as approved or concurred. The Government will retain three (3) copies of the submittal and return three (3) copy(ies) of the submittal.

1.14. INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. The Government will retain zero(0) copies of information only submittals.

End of Section 01 33 00.0005

**SECTION 01 33 16
DESIGN AFTER AWARD**

1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.2. DESIGNER OF RECORD

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

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3.1.2. Post Award Conference

3.1.3. Partnering & Project Progress Processes

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3.2.5. Design Complete Submittals

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3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1. General

3.4.2. Procedures

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3.5. INTERIM DESIGN REQUIREMENTS

3.5.1. Drawings

3.5.2. Design Analyses

3.5.3. Geotechnical Investigations and Reports

3.5.4. LEED Documentation

3.5.5. Energy Conservation

3.5.6. Specifications

3.5.7. Building Rendering

3.5.8. Interim Building Design Contents

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

3.7. FINAL DESIGN REQUIREMENTS

3.7.1. Drawings

3.7.2. Design Analysis

3.7.3. Specifications

3.7.4. Submittal Register

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

3.7.6. Acceptance and Release for Construction

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

3.9.2. Web based Design Submittals

3.9.3. Mailing of Design Submittals

3.10. AS-BUILT DOCUMENTS

ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

ATTACHMENT B FURNITURE, FIXTURES AND EQUIPMENT REQUIREMENTS

ATTACHMENT C TRACKING COMMENTS IN DRCHECKS

ATTACHMENT D SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

ATTACHMENT E LEED SUBMITTALS

ATTACHMENT F BUILDING INFORMATION MODELING REQUIREMENTS

ATTACHMENT G DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT

1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.1.1. The information contained in this section applies to the design required after award. After award, the Contractor will develop the accepted proposal into the completed design, as described herein.

1.1.2. The Contractor may elect to fast track the design and construction that is, proceed with construction of parts of the sitework and facilities prior to completion of the overall design. To facilitate fast tracking, the Contractor may elect to divide the design into no more than ten (10) design packages per major facility type and no more than three (3) design packages for site and associated work. Designate how it will package the design, consistent with its overall plan for permitting (where applicable) and construction of the project. See Sections 01 33 00 SUBMITTAL PROCEDURES and 01 32 01.00 10 PROJECT SCHEDULE for requirements for identifying and scheduling the design packaging plan in the submittal register and project schedule. See also Sections 01 10 00 STATEMENT OF WORK and 01 57 20.00 10 ENVIRONMENTAL PROTECTION for any specified permit requirements. If early procurement of long-lead item construction materials or installed equipment, prior to completion of the associated design package, is necessary to facilitate the project schedule, also identify those long-lead items and how it will assure design integrity of the associated design package to meet the contract requirements (The Contract consists of the Solicitation requirements and the accepted proposal). Once the Government is satisfied that the long-lead items meet the contract requirements, the Contracting Officer will allow the Contractor to procure the items at its own risk.

1.1.3. The Contractor may proceed with the construction work included in a separate design package after the Government has reviewed the final (100%) design submission for that package, review comments have been addressed and resolved to the Government's satisfaction and the Contracting Officer (or the Administrative Contracting Officer) has agreed that the design package may be released for construction.

1.1.4. **INTEGRATED DESIGN.** To the maximum extent permitted for this project, use a collaborative, integrated design process for all stages of project delivery with comprehensive performance goals for siting, energy, water, materials and indoor environmental quality and ensures incorporation of these goals. Consider all stages of the building lifecycle, including deconstruction.

1.2. DESIGNER OF RECORD

Identify, for approval, the Designer of Record ("DOR") that will be responsible for each area of design. One DOR may be responsible for more than one area. Listed, Professional Registered, DOR(s) shall account for all areas of design disciplines shall be accounted for by a listed. The DOR's shall stamp, sign, and date each design drawing and other design deliverables under their responsible discipline at each design submittal stage (see contract clause Registration of Designers). If the deliverables are not ready for release for construction, identify them as "preliminary" or "not for release for construction" or by using some other appropriate designation. The DOR(s) shall also be responsible for maintaining the integrity of the design and for compliance with the contract requirements through construction and documentation of the as-built condition by coordination, review and approval of extensions of design, material, equipment and other construction submittals, review and approval or disapproval of requested deviations to the accepted design or to the contract, coordination with the Government of the above activities, and by performing other typical professional designer responsibilities.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. PRE-WORK ACTIVITIES & CONFERENCES

3.1.1. Design Quality Control Plan

Submit for Government acceptance, a Design Quality Control Plan in accordance with Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL before design may proceed.

3.1.2. Post Award Conference

3.1.2.1. The government will conduct a post award contract administration conference at the project site, as soon as possible after contract award. This will be coordinated with issuance of the contract notice to proceed (NTP). The Contractor and major sub-contractor representatives shall participate. All designers need not attend this first meeting. Government representatives will include COE project delivery team members, facility users, facility command representatives, and installation representatives. The Government will provide an agenda, meeting goals, meeting place, and meeting time to participants prior to the meeting.

3.1.2.2. The post award conference shall include determination and introduction of contact persons, their authorities, contract administration requirements, discussion of expected project progress processes, and coordination of subsequent meetings for quality control (see Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL), Partnering (see below and SCR: Partnering), and the initial design conference (see below).

3.1.2.3. The government will introduce COE project delivery team members, facility users, facility command representatives, and installation representatives. The DB Contractor shall introduce major subcontractors, and other needed staff. Expectations and duties of each person shall be defined for all participants. A meeting roster shall be developed and distributed by the government with complete contact information including name, office, project role, phone, mailing and physical address, and email address.

3.1.3. Partnering & Project Progress Processes

3.1.3.1. The initial Partnering conference may be scheduled and conducted at any time with or following the post award conference. The Government proposes to form a partnership with the DB Contractor to develop a cohesive building team. This partnership will involve the COE project delivery team members, facility users, facility command representatives, installation representatives, Designers of Record, major subcontractors, contractor quality control staff, and contractor construction management staff. This partnership will strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership will be bilateral in membership and participation will be totally voluntary. All costs, excluding labor and travel expenses, shall be shared equally between the Government and the Contractor. The Contractor and Government shall be responsible for their own labor and travel costs. Normally, partnering meetings will be held at or in the vicinity of the project installation.

3.1.3.2. As part of the partnering process, the Government and Contractor shall develop, establish, and agree to comprehensive design development processes including conduct of conferences, expectations of design development at conferences, fast-tracking, design acceptance, Structural Interior Design (SID)/ Furniture, Fixtures & Equipment (FF&E) design approval, project closeout, etc. The government will explain contract requirements and the DB Contractor shall review their proposed project schedule and suggest ways to streamline processes.

3.1.4. Initial Design Conference

The initial design conference may be scheduled and conducted at the project installation any time after the post award conference, although it is recommended that the partnering process be initiated with or before the initial design conference. Any design work conducted after award and prior to this conference should be limited to site and is discouraged for other items. All Designers of Record shall participate in the conference. The purpose of the meeting is to introduce everyone and to make sure any needs the contractor has are assigned and due dates established as well as who will get the information. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning the BIM Implementation Plan demonstration at this meeting. The DB Contractor shall conduct the initial design conference.

3.1.5. Pre-Construction Conference

Before starting construction activities, the Contractor and Government will jointly conduct a pre-construction administrative conference to discuss any outstanding requirements and to review local installation requirements for start of construction. It is possible there will be multiple Pre-Construction Conferences based on the content of the design packages selected by the Contractor. The Government will provide minutes of this meeting to all participants.

3.2. STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

The stages of design submittals described below define Government expectations with respect to process and content. The Contractor shall determine how to best plan and execute the design and review process for this project, within the parameters listed below. As a minimum, the Government expects to see at least one interim design submittal, at least one final design submittal before construction of a design package may proceed and at least one Design Complete submittal that documents the accepted design. The Contractor may sub-divide the design into separate packages for each stage of design and may proceed with construction of a package after the Government accepts the final design for that package. See discussion on waivers to submission of one or more intermediate design packages where the parties partner during the design process. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning BIM and the various stages of design submittals and over-the-shoulder progress reviews.

3.2.1. Site/Utilities

To facilitate fast-track design-construction activities the contractor may submit a final (100%) site and utility design as the first design submittal or it may elect to submit interim and final site and utility design submittals as explained below. Following review, resolution, and incorporation of all Government comments, and submittal of a satisfactory set of site/utility design documents, after completing all other pre-construction requirements in this contract and after the pre-construction meeting, the Government will allow the Contractor to proceed with site development activities, including demolition where applicable, within the parameters set forth in the accepted design submittal. For the first site and utility design submission, whether an interim or final, the submittal review, comment, and resolution times from this specification apply, except that the Contractor shall allow the Government a 14 calendar day review period, exclusive of mailing time. No on-site construction activities shall begin prior to written Government clearance to proceed.

3.2.2. Interim Design Submittals

The Contractor may submit either a single interim design for review, representing a complete package with all design disciplines, or split the interim design into smaller, individual design packages as it deems necessary for fast-track construction purposes. As required in Section 01 32 01.00 10 PROJECT SCHEDULE, the Contractor shall schedule its design and construction packaging plan to meet the contract completion period. This submission is the Government's primary opportunity to review the design for conformance to the solicitation and to the accepted contract proposal and to the Building Codes at a point where required revisions may be still made, while minimizing lost design effort to keep the design on track with the contract requirements. The requirements for the interim design review submittals and review conferences are described hereinafter. This is not necessarily a hold point for the design process; the Contractor may designate the interim design submittal(s) as a snapshot and proceed with design development at its own risk. See below for a waiver, where the parties establish an effective over-the-shoulder progress review procedure through the partnering process that would eliminate the need for or expedite a formal intermediate design review on one or more individual design packages.

3.2.3. Over-the-Shoulder Progress Reviews

To facilitate a streamlined design-build process, the Government and the Contractor may agree to one-on-one reviewer or small group reviews, electronically, on-line (if available within the Contractor's standard design practices) or at the Contractor's design offices or other agreed location, when practicable to the parties. The Government and Contractor will coordinate such reviews to minimize or eliminate disruptions to the design process. Any data required for these reviews shall normally be provided in electronic format, rather than in hard copy. If the Government and Contractor establish and implement an effective, mutually agreeable partnering procedure for regular (e.g., weekly) over-the-shoulder review procedures that allow the Government reviewers the opportunity to keep fully informed of the progress, contents, design intent, design documentation, etc. of the design package, the Government will agree to waive or to expedite the formal intermediate design review period for that package. The Contractor shall still be required to submit the required intermediate design documentation, however the parties may agree to how that material will be provided, in lieu of a formal consolidated submission of the package. It should be noted that Government funding is extremely limited for non-local travel by design reviewers, so the maximum use of virtual teaming methods must be used. Some possible examples include electronic file sharing, interactive software with on-line or telephonic conferencing, televideo conferencing, etc. The Government must still perform its Code and Contract conformance reviews, so the Contractor is encouraged to partner with the reviewers to find ways to facilitate this process and to facilitate meeting or bettering the design-build schedule. The Contractor shall maintain a fully functional configuration management system as described herein to track design revisions, regardless of whether or not there is a need for a formal intermediate design review. The formal intermediate

review procedures shall form the contractual basis for the official schedule, in the event that the partnering process determines that the formal intermediate review process to be best suited for efficient project execution. However, the Government pledges to support and promote the partnering process to work with the Contractor to find ways to better the design schedule.

3.2.4. Final Design Submissions

This submittal is required for each design package prior to Government acceptance of that design package for construction. The requirements for the final design submittal review conferences and the Government's acceptance for start of construction are described herein after.

3.2.5. Design Complete Submittals

After the final design submission and review conference for a design package, revise the design package to incorporate the comments generated and resolved in the final review conferences, perform and document a back-check review and submit the final, design complete documents, which shall represent released for construction documents. The requirements for the design complete submittals are described hereinafter.

3.2.6. Holiday Periods for Government Review or Actions

Do not schedule meetings, Government reviews or responses during the last two weeks of December or other designated Government Holidays (including Friday after Thanksgiving). Exclude such dates and periods from any durations specified herein for Government actions.

3.2.7. Late Submittals and Reviews

If the Contractor cannot meet its scheduled submittal date for a design package, it must revise the proposed submittal date and notify the government in writing, at least one (1) week prior to the submittal, in order to accommodate the Government reviewers' other scheduled activities. If a design submittal is over one (1) day late in accordance with the latest revised design schedule, or if notification of a proposed design schedule change is less than seven (7) days from the anticipated design submission receipt date, the Government review period may be extended up to seven (7) days due to reviewers' schedule conflicts. If the Government is late in meeting its review commitment and the delay increases the Contractor's cost or delays completion of the project, the Suspension of Work and Defaults clauses provide the respective remedy or relief for the delay.

3.3. DESIGN CONFIGURATION MANAGEMENT

3.3.1. Procedures

Develop and maintain effective, acceptable design configuration management (DCM) procedures to control and track all revisions to the design documents after the Interim Design Submission through submission of the As-Built documents. During the design process, this will facilitate and help streamline the design and review schedule. After the final design is accepted, this process provides control of and documents revisions to the accepted design (See Special Contract Requirement: Deviating From the Accepted Design). The system shall include appropriate authorities and concurrences to authorize revisions, including documentation as to why the revision must be made. The DCM data shall be available to the Government reviewers at all times. The Contractor may use its own internal system with interactive Government concurrences, where necessary or may use the Government's "DrChecks Design Review and Checking System" (see below and Attachment C).

3.3.2. Tracking Design Review Comments

Although the Contractor may use its own internal system for overall design configuration management, the Government and the Contractor shall use the DrChecks Design Review and Checking System to initiate, respond to, resolve and track Government design compliance review comments. This system may be useful for other data which needs to be interactive or otherwise available for shared use and retrieval. See Attachment C for details on how to establish an account and set-up the DrChecks system for use on the project.

3.3.3. Design and Code Checklists

Develop and complete various discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists with each design submittal, as applicable, as part of the project documentation. See Section 01 45 04.00 10 Contractor Quality Control, Attachment D for a Sample Fire Protection and Life Safety Code review checklist and Attachment E for LEED SUBMITTALS.

3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1. General

At least one interim design submittal, review and review conference is required for each design package (except that, per paragraph 3.2.1, the Contractor may skip the interim design submission and proceed directly to final design on the sitework and utilities package). The DB Contractor may include additional interim design conferences or over-the-shoulder reviews, as needed, to assure continued government concurrence with the design work. Include the interim submittal review periods and conferences in the project schedule and indicate what part of the design work is at what percentage of completion. The required interim design conferences shall be held when interim design requirements are reached as described below. See also Paragraph: **Over-the-Shoulder Progress Reviews** for a waiver to the formal interim design review.

3.4.2. Procedures

After receipt of an Interim Design submission, allow the Government fourteen (14) calendar days after receipt of the submission to review and comment on the interim design submittal. For smaller design packages, especially those that involve only one or a few separate design disciplines, the parties may agree on a shorter review period or alternative review methods (e.g., over-the-shoulder or electronic file sharing), through the partnering process. For each interim design review submittal, the COR will furnish, to the Contractor, a single consolidated, validated listing of all comments from the various design sections and from other concerned agencies involved in the review process using the DrChecks Design Review and Checking System. The review will be for conformance with the technical requirements of the solicitation and the Contractor's RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. Furnish disposition of all comments, in writing, through DrChecks. The Contractor is cautioned that if it believes the action required by any comment exceeds the requirements of this contract, that it should take no action and notify the COR in writing immediately. The Interim Review conference will be held for each design submittal at the installation. Bring the personnel that developed the design submittal to the review conference. The conference will take place the week after the receipt of the comments by the Contractor. For smaller fast-track packages that involve only a few reviewers, the parties may agree to alternative conferencing methods, such as teleconferencing, or televideo, where available, as determined through Partnering.

3.4.3. Conference Documentation

3.4.3.1. In order to facilitate and accelerate the Government code and contract conformance reviews, identify, track resolution of and maintain all comments and action items generated during the design process and make this available to the designers and reviewers prior to the Interim and subsequent design reviews.

3.4.3.2. The DB Contractor shall prepare meeting minutes and enter final resolution of all comments into DrChecks. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Incorporate valid comments. The Government reserves the right to reject design document submittals if comments are significant. Participants shall determine if any comments are critical enough to require further design development prior to government concurrence. Participants shall also determine how to proceed in order to obtain government concurrence with the design work presented.

3.5. INTERIM DESIGN REQUIREMENTS

Interim design deliverables shall include drawings, specifications, and design analysis for the part of design that the Contractor considers ready for review.

3.5.1. Drawings

Include comments from any previous design conferences incorporated into the documents to provide an interim design for the "part" submitted.

3.5.2. Design Analyses

3.5.2.1. The designers of record shall prepare and present design analyses with calculations necessary to substantiate and support all design documents submitted. Address design substantiation required by the applicable codes and references and pay particular attention to the following listed items:

3.5.2.2. For parts including sitework, include site specific civil calculations.

3.5.2.3. For parts including structural work, include structural calculations.

- (a) Identify all loads to be used for design.
- (b) Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.
- (c) Provide calculations for all principal roof, floor, and foundation members and bracing and secondary members.
- (d) Provide complete seismic analyses for all building structural, mechanical, electrical, architectural, and building features as dictated by the seismic zone for which the facility is being constructed.
- (e) Computer generated calculations must identify the program name, source, and version. Provide input data, including loads, loading diagrams, node diagrams, and adequate documentation to illustrate the design. The schematic models used for input must show, as a minimum, nodes/joints, element/members, materials/properties, and all loadings, induced settlements/deflections, etc., and a list of load combinations. Include an output listing for maximum/minimum stresses/forces and deflections for each element and the reactions for each loading case and combination.
- (f) See also the Security (Anti-Terrorism) requirements below for members subject to Anti-Terrorist Force Protection (ATFP) and Progressive Collapse requirements.
- (g) Fully coordinate and integrate the overall structural design between two different or interfacing construction types, such as modular and stick-built or multistory, stacked modular construction. Provide substantiation of structural, consolidation/settlement analysis, etc., as applicable, through the interfaces.

3.5.2.4. For Security (Anti-Terrorism): Provide a design narrative and calculations where applicable, demonstrating compliance with each of the 22 standards in UFC 4-010-01, which includes Design of Buildings to Resist Progressive Collapse (use the most recent version of UFC 4-023-03, regardless of references to any specific version in UFC 4-010-01). Where sufficient standoff distance is not being provided, show calculations for blast resistance of the structural system and building envelope. Show complete calculations for members subjected to ATFP loads, e.g., support members of glazed items (jambes, headers, sills) connections of windows to support members and connections of support members to the rest of the structure. For 3 story and higher buildings, provide calculations to demonstrate compliance with progressive collapse requirements.

3.5.2.5. For parts including architectural work, include building floor area analysis.

3.5.2.6. For parts including mechanical work, include HVAC analysis and calculations. Include complete design calculations for mechanical systems. Include computations for sizing equipment, compressed air systems, air duct design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation is required (see paragraph 3.5.5.2 for list of acceptable software). Based on the results of calculations, provide a complete list of the materials and equipment proposed with the manufacturer's published cataloged product installation specifications and roughing-in data.

3.5.2.7. For parts including life safety, include building code analysis and sprinkler and other suppression systems. Notwithstanding the requirements of the Codes, address the following:

- (a) A registered fire protection engineer (FPE) must perform all fire protection analyses. Provide the fire protection engineer's qualifications. See Section 01 10 00, paragraph 5 for qualifications.

- (b) Provide all references used in the design including Government design documents and industry standards used to generate the fire protection analysis.
- (c) Provide classification of each building in accordance with fire zone, building floor areas and height and number of stories.
- (d) Provide discussion and description of required fire protection requirements including extinguishing equipment, detection equipment, alarm equipment and water supply. Alarm and detection equipment shall interface to requirements of Electronic Systems.
- (e) Provide hydraulic calculations based on water flow test for each sprinkler system to insure that flow and pressure requirements can be met with current water supply. Include copies of Contractor's water flow testing done to certify the available water source.

3.5.2.8. For parts including plumbing systems:

- (a) List all references used in the design.
- (b) Provide justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.
- (c) Detail calculations for systems such as sizing of domestic hot water heater and piping; natural gas piping; LP gas piping and tanks, fuel oil piping and tanks, etc., as applicable.
- (d) When the geotechnical report indicates expansive soils are present, indicate in the first piping design submittal how piping systems will be protected against damage or backfall/backflow due to soil heave (from penetration of slab to the 5 foot building line).

3.5.2.9. For elevator systems:

- (a) List all criteria codes, documents and design conditions used.
- (b) List any required permits and registrations for construction of items of special mechanical systems and equipment.

3.5.2.10. For parts including electrical work, include lighting calculations to determine maintained foot-candle levels, electrical load analysis and calculations, electrical short circuit and protective device coordination analysis and calculations and arc fault calculations.

3.5.2.11. For parts including telecommunications voice/data (including SIPRNET, where applicable), include analysis for determining the number and placement of outlets

3.5.2.12. For Cathodic Protection Systems, provide the following stamped report by the licensed corrosion engineer or NACE specialist with the first design submission. The designer must be qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. He/she must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection Specialist, or must be a registered professional engineer with a minimum of five years experience in corrosion control and cathodic protection. Clearly describe structures, systems or components in soil or water to be protected. Describe methods proposed for protection of each.

3.5.3. Geotechnical Investigations and Reports:

3.5.3.1. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal. Make this information available as early as possible during the over-the-shoulder progress review process. Summarize the subsurface conditions and provide recommendations for the design of appropriate utilities, foundations, floor slabs, retaining walls, embankments, and pavements. Include compaction requirements for fill and backfill under buildings, sidewalks, other structures and open areas. Recommend foundation systems to be used, allowable bearing pressures for footings, lateral load resistance capacities for foundation systems, elevations for footings, grade beams, slabs, etc. Provide an assessment of post-construction settlement potential including total and differential. Provide recommendations regarding lateral earth pressures (active, at-rest, passive) to be used in the design of retaining walls. Include the recommended spectral accelerations and Site Class for seismic design along with an evaluation of any seismic hazards and recommendations for mitigation, if required. Include calculations to support the recommendations for bearing capacity, settlement, and pavement sections. Include supporting documentation for all recommended

design parameters such as Site Class, shear strength, earth pressure coefficients, friction factors, subgrade modulus, California Bearing Ratio (CBR), etc. Provide earthwork recommendations, expected frost penetration, expected groundwater levels, recommendations for dewatering and groundwater control and the possible presence of any surface or subsurface features that may affect the construction of the project such as sinkholes, boulders, shallow rock, old fill, old structures, soft areas, or unusual soil conditions. Include pH tests, salinity tests, resistivity measurements, etc., required to design corrosion control and grounding systems. Include the raw field data. Arrange a meeting with the Government subsequent to completion and evaluation of the site specific geotechnical exploration to outline any differences encountered that are inconsistent with the Government provided preliminary soils information. Clearly outline differences which require changes in the foundation type, or pavement and earthwork requirements from that possible and contemplated using the Government furnished preliminary soils investigation, which result in a change to the design or construction. Any equitable adjustment is subject to the provisions of the contract's Differing Site Conditions Clause.

3.5.3.2. Vehicle Pavements: The Contractor's geotechnical report shall contain flexible and rigid pavement designs, as applicable for the project, including design CBR and modulus of subgrade reaction and the required compaction effort for subgrades and pavement layers. Provide Information on the types of base course materials available in the area and design strengths.

3.5.3.3. The Contractor and the professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the Contractor's final geotechnical report. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the first design submission. If revisions are made to the initial design submission, a new certification shall be provided with the final design submission.

3.5.4. LEED Documentation:

Assign a LEED Accredited Professional, responsible to track LEED planning, performance and documentation for each LEED credit through construction closeout. Incorporate LEED credits in the plans, specifications and design analyses. Develop LEED supporting documentation as a separable portion of the Design Analysis and provide with each required design submittal. Include the LEED Project checklist for each non-exempt facility (one checklist may be provided for multiple facilities in accordance with the LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects and the LEED SUBMITTALS (Attachment E, herein) with each submittal. Final design submittal for each portion of the work must include all required design documentation relating to that portion of work (example - all site credit design documents with final site design). Submittal requirements are as indicated in Attachment E, LEED SUBMITTALS. Submit all documentation indicated on Attachment E as due at final design at final design submittal (for fast-track projects with multiple final design submittals, this shall be at the last scheduled final design submittal). All project documentation related to LEED shall conform to USGBC requirements for both content and format, including audit requirements and be separate from other design analyses. Maintain and update the LEED documentation throughout project progress to construction closeout and shall compile product data, receipts, calculations and other data necessary to substantiate and support all credits claimed. The Government may audit any or all individual credits. Audit documentation is not required to be submitted unless requested. These requirements apply to all projects. If the project requires the Contractor to obtain USGBC certification, the Contractor shall also be responsible for obtaining USGBC certification and shall provide written evidence of certification with the construction closeout LEED documentation submittal. Install the USGBC building plaque at the location indicated by the Government upon receipt. If Contractor obtains USGBC interim design review, submit the USGBC review to the Government within 30 days of receipt for information only.

3.5.4.1. LEED Documentation for Technology Solution Set. If the Solicitation provides a Prescriptive Technology Solution Set, use of the Technology Solution set has no effect on LEED documentation requirements. Provide all required LEED documentation, including energy analysis, in accordance with LEED requirements when using the Technology Solution Set.

3.5.5. Energy Conservation:

3.5.5.1. Refer to Section 01 10 00, Paragraph 5. Interim and Final Design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Use Compliance Documentation forms available from ASHRAE and included in the ASHRAE 90.1 User's Manual for this purpose. The Architectural Section of the Design Analysis shall include completed forms titled "Building Envelope

Compliance Documentation Parts I and II". The Heating Ventilating and Air Conditioning (HVAC) Section of the Design Analysis shall include a completed form titled "HVAC Simplified Approach Option - Part I" if this approach is allowed by the Standard. Otherwise, the HVAC Section of the Design Analysis shall include completed forms titled "HVAC Mandatory Provisions - Part II" and "HVAC Prescriptive Requirements - Part III". The Plumbing Section of the Design Analysis shall include a completed form titled "Service Water Heating Compliance Documentation". The Electrical Section of the Design Analysis shall include an explanatory statement on how the requirements of ASHRAE 90.1-2004 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

3.5.5.2. Interim and Final Design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document (a) the baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1 and (b) the energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract. Use the USGBC Energy and Atmosphere (EA) Credit 1 compliance template / form or an equivalently detailed form for documenting compliance with the energy reduction requirements. This template / form is titled PERFORMANCE RATING METHOD and is available when the project is registered for LEED. The calculation methodology used for this documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with two exceptions: a) receptacle and process loads may be omitted from the calculation; and b) the definition of the terms in the formula for Percentage Improvement found in paragraph G1.2 are modified as follows: Baseline Building Performance shall mean the annual energy consumption calculated for a building design intended for use as a baseline for rating above standard design meeting the minimum requirements of the energy standard, and Proposed Building Performance shall mean annual energy consumption calculated for the proposed building design intended for construction. This calculation shall address all energy consuming systems in a single integrated methodology. Include laboratory fume hoods and kitchen ventilation loads in the energy calculation. They are not considered process loads. Individual calculations for heating, cooling, power, lighting, power, etc. systems will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, EnergyPlus by DOD/DOE.

3.5.6. Specifications

Specifications may be any one of the major, well known master guide specification sources (use only one source) such as MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2004 numbering system), etc. (including specifications from these sources). Manufacturers' product specifications, utilizing CSI's Manu-Spec, three part format may be used in conjunction with the selected specifications. The designers of record shall edit and expand the appropriate Specifications to insure that all project design requirements, current code requirements, and regulatory requirements are met. Specifications shall clearly identify, where appropriate, specific products chosen to meet the contract requirements (i.e., manufacturers' brand names and model numbers or similar product information).

3.5.7. Building Rendering

Present and provide a draft color computer, artist, or hand drawn rendering with the conceptual design submittal of the building exterior. Perspective renderings shall include a slightly overhead view of the entire building to encompass elevations and the roof configuration of the building. After Government review and acceptance, provide a final rendering, including the following:

Three (3) 18" x 24" color prints, framed and matted behind glass with project title underneath the print.

One (1) Image file (high resolution) in JPG format on CD for those in the submittal distribution list.

3.5.8. Interim Building Design Contents

The following list represents what the Government considers should be included in the overall completed design for a facility or project. It is not intended to limit the contractor from providing different or additional information as needed to support the design presented, including the require design analyses discussed above. As the Contractor develops individual design packages and submits them for Interim review, include as much of the applicable

information for an individual design package as is developed at the Interim design level for review purposes. These pieces shall be developed as the design progresses toward the design complete stage.

3.5.8.1. Lawn and Landscaping Irrigation System

3.5.8.2. Landscape, Planting and Turfing

3.5.8.3. Architectural

- (a) Design Narrative
- (b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations
- (c) Finish schedule
- (d) All required equipment
- (e) Special graphics requirements
- (f) Door and Window Schedules
- (g) Hardware sets using BHMA designations
- (h) Composite floor plan showing all pre-wired workstations
- (i) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements
- (j) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements

3.5.8.4. Structural Systems. Include:

- (a) Drawings showing principal members for roof and floor framing plans as applicable
- (b) Foundation plan showing main foundation elements where applicable
- (c) Typical sections for roof, floor, and foundation conditions

3.5.8.5. Plumbing Systems

- (a) Show locations and general arrangement of plumbing fixtures and major equipment
- (b) Plan and isometric riser diagrams of all areas including hot water, cold water, waste and vent piping. Include natural gas (and meter as required), (natural gas and meter as required), (LP gas), (fuel oil) and other specialty systems as applicable.
- (c) Include equipment and fixture connection schedules with descriptions, capacities, locations, connection sizes and other information as required

3.5.8.6. HVAC Systems

- (a) Mechanical Floor Plans: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:
 - (1) Room designations.
 - (2) Mechanical legend and applicable notes.
 - (3) Location and size of all ductwork and piping.
 - (4) Location and capacity of all terminal units (i.e., registers, diffusers, grilles, hydronic baseboards).
 - (5) Pre-Fabricated Paint Spray Booth (where applicable to project scope)
 - (6) Paint Preparation Area (where applicable to project scope)
 - (7) Exhaust fans and specialized exhaust systems.
 - (8) Thermostat location.
 - (9) Location of heating/cooling plant (i.e., boiler, chiller, cooling tower, etc).
 - (10) Location of all air handling equipment.

- (11) Air balancing information.
- (12) Flue size and location.
- (13) Piping diagram for forced hot water system (if used).
- (b) Equipment Schedule: Provide complete equipment schedules. Include:
 - (1) Capacity
 - (2) Electrical characteristics
 - (3) Efficiency (if applicable)
 - (4) Manufacturer's name
 - (5) Optional features to be provided
 - (6) Physical size
 - (7) Minimum maintenance clearances
- (a) Details: Provide construction details, sections, elevations, etc., only where required for clarification of methods and materials of design.
- (b) HVAC Controls: Submit complete HVAC controls equipment schedules, sequences of operation, wiring and logic diagrams, Input/Output Tables, equipment schedules, and all associated information. See the Statement of Work for additional specific requirements.

3.5.8.7. Fire Protection and Life Safety.

- (a) Provide plan for each floor of each building that presents a compendium of the total fire protection features being incorporated into the design. Include the following types of information:
 - (1) The location and rating of any fire-resistive construction such as occupancy separations, area separations, exterior walls, shaft enclosures, corridors, stair enclosures, exit passageways, etc.
 - (2) The location and coverage of any fire detection systems
 - (3) The location and coverage of any fire suppression systems (sprinkler risers, standpipes, etc.)
 - (4) The location of any other major fire protection equipment
 - (5) Indicate any hazardous areas and their classification
 - (6) Schedule describing the internal systems with the following information: fire hazard and occupancy classifications, building construction type, GPM/square foot sprinkler density, area of operation and other as required
- (b) Working plans and all other materials submitted shall meet NFPA 13 requirements, with respect to required minimum level of detail.

3.5.8.8. Elevators. Provide:

- (a) Description of the proposed control system
- (b) Description, approximate capacity and location of any special mechanical equipment for elevators.

3.5.8.9. Electrical Systems.

- (a) Electrical Floor Plan(s): Show all principle architectural features of the building which will affect the electrical design. Show the following:
 - (1) Room designations.
 - (2) Electrical legend and applicable notes.
 - (3) Lighting fixtures, properly identified.
 - (4) Switches for control of lighting.
 - (5) Receptacles.

- (6) Location and designation of panelboards. Clearly indicate type of mounting required (flush or surface) and reflect accordingly in specifications.
- (7) Service entrance (conduit and main disconnect).
- (8) Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.
- (b) Building Riser Diagram(s) (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.
- (c) Load Center Panelboard Schedule(s): Indicate the following information:
 - (1) Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.
 - (2) Branch Circuit Designations.
 - (3) Load Designations.
 - (4) Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)
 - (5) Branch Circuit Connected Loads (AMPS).
 - (6) Special Features
- (d) Lighting Fixture Schedule(s): Indicate the following information:
 - (1) Fixture Designation.
 - (2) General Fixture Description.
 - (3) Number and Type of Lamp(s).
 - (4) Type of Mounting.
 - (5) Special Features.
- (e) Details: Provide construction details, sections, elevations, etc. only where required for clarification of methods and materials of design.

3.5.8.10. Electronic Systems including the following responsibilities:

- (a) Fire Detection and Alarm System. Design shall include layout drawings for all devices and a riser diagram showing the control panel, annunciator panel, all zones, radio transmitter and interfaces to other systems (HVAC, sprinkler, etc.)
- (b) Fire Suppression System Control. Specify all components of the Fire Suppression (FS) System in the FS section of the specifications. Clearly describe how the system will operate and interact with other systems such as the fire alarm system. Include a riser diagram on the drawings showing principal components and interconnections with other systems. Include FS system components on drawing legend. Designate all components shown on floor plans "FS system components" (as opposed to "Fire Alarm components"). Show location of FS control panels, HVAC control devices, sensors, and 120V power panel connections on floor plans. Indicate zoning of areas by numbers (1, 2, 3) and detectors sub-zoned for cross zoning by letter designations (A and B). Differentiate between ceiling mounted and under floor detectors with distinct symbols and indicate sub-zone of each.
- (c) Public Address System
- (d) Special Grounding Systems. Completely reflect all design requirements in the specifications and drawings. Specifications shall require field tests (in the construction phase), witnessed by the Government, to determine the effectiveness of the grounding system. Include drawings showing existing construction, if any.
- (e) Cathodic Protection.
- (f) Intrusion Detection, Card Access System
- (g) Central Control and Monitoring System
- (h) Mass Notification System
- (i) Electrical Power Distribution Systems

3.5.8.11. Information Systems including the following responsibilities:

- (a) Telecommunications Cabling
- (b) Supporting Infrastructure
- (a) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones
 - (a) Include a layout of the voice/data outlets (including voice only wall & pay phones) on telecommunication floor plan drawing, location of SIPRNET data outlets (where applicable), and a legend and symbol definition to indicate height above finished floor. Show size of conduit and cable type and size on Riser Diagram. Do not show conduit runs between backboard and outlets on the floor plans. Show underground distribution conduit and cable with sizing from point of presence to entrance facility of building.
 - (b) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID's
 - (c) Communication Equipment Rooms - Plan Views - Tech and AMEP/Elevations - Racks and Walls. Elevations with a detailed look at all telecom rooms. Indicate technology layout (racks, ladder-racks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. They may also be an enlargement of a congested area of T1 or T2 series drawing.

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

A final design review and review conference will be held upon completion of final design at the project installation, or – where equipment is available - by video teleconference or a combination thereof, for any design package to receive Government acceptance to allow release of the design package for construction. For smaller separate design packages, the parties may agree on alternative reviews and conferences (e.g., conference calls and electronic file sharing, etc.) through the Partnering process. Include the final design conference in the project schedule and shall indicate what part of the design work is at 100% completion. The final design conference will be held after the Government has had seven (7) calendar days after receipt of the submission to review the final design package and supporting data. For smaller packages, especially those involving only one or a few design disciplines the parties may agree on a shorter period.

3.7. FINAL DESIGN REQUIREMENTS

Final design deliverables for a design package shall consist of 100% complete drawings, specifications, submittal register and design analyses for Government review and acceptance. The 100% design submission shall consist of drawings, specifications, updated design analyses and any permits required by the contract for each package submitted. In order to expedite the final design review, prior to the conference, ensure that the design configuration management data and all review comment resolutions are up-to-date. Include the 100% SID and 100% FF&E binders for government approval. The Contractor shall have performed independent technical reviews (ITR's) and back-checks of previous comment resolutions, as required by Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL, including providing documentation thereof.

3.7.1. Drawings

3.7.1.1. Submit drawings complete with all contract requirements incorporated into the documents to provide a 100% design for each package submitted.

3.7.1.2. Prepare all drawings with the Computer-Aided Design and Drafting (CADD)/Computer-Aided Design (CAD) system, organized and easily referenced electronically, presenting complete construction information.

3.7.1.3. Drawings shall be complete. The Contractor is encouraged to utilize graphics, views, notes, and details which make the drawings easier to review or to construct but is also encouraged to keep such materials to those that are necessary.

3.7.1.4. Provide detail drawings that illustrate conformance with the contract. Include room finish schedules, corresponding color/finish/special items schedules, and exterior finish schedules that agree with the submitted SID binders.

3.7.1.5. The design documents shall be in compliance with the latest version of the A/E/C CADD Standard, available at <https://caddbim.usace.army.mil/CAD>. Use the approved vertical Corps of Engineers title blocks and borders on all drawings with the appropriate firm name included within the title block area.

3.7.1.6. CAD System and Building Information Modeling (BIM) (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order.)

All CAD files shall be fully compatible with MicroStation V8 or higher. Save all design CAD files as MicroStation V8 or higher files. All submitted BIM Models and associated Facility Data shall be fully compatible with Bentley BIM file format and the USACE Bentley BIM v8 Workspace.

(a) CAD Data Final File Format: During the design development capture geo-referenced coordinates of all changes made to the existing site (facility footprint, utility line installations and alterations, roads, parking areas, etc) as a result of this contract. There is no mandatory methodology for how the geo-referenced coordinates will be captured, however, Engineering and Construction Bulletin No. 2006-15, Subject: Standardizing Computer Aided Design (CAD) and Geographic Information Systems (GIS) Deliverables for all Military Design and Construction Projects identifies the format for final as-built drawings and data sets to be delivered to the government. Close-out requirements at the as-built stage; require final geo-referenced GIS Database of the new facility along with all exterior modifications. The Government will incorporate this data set into the Installation's GIS Masterplan or Enterprise GIS System. See also, Section 01 78 02.00 10 Closeout Submittals.

(b) Electronic Drawing Files: In addition to the native CAD design files, provide separate electronic drawing files (in editable CAD format and Adobe Acrobat PDF version 7.0 or higher) for each project drawing.

(c) Each file (both CAD and PDF) shall represent one complete drawing from the drawing set, including the date, submittal phase, and border. Each drawing file shall be completely independent of any data in any other file, including fonts and shapes not included with the basic CAD software program utilized. Drawing files with external references or special fonts are not acceptable. All displayed graphic elements on all levels of the drawing files shall be part of the project drawing image. The drawing files shall not contain any graphic element that is not part of the drawing image.

(d) Deliver BIM Model and associated Facility Data files in their native format. At a minimum, BIM files shall address major architecture design elements, major structural components, mechanical systems and electrical/communication distribution and elements as defined in Attachment F. See Attachment F for additional BIM requirements.

(e) Drawing Index: Provide an index of drawings sheet in CAD as part of the drawing set, and an electronic list in Microsoft Excel of all drawings on the CD. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

(f) Hard Copies: Plot submitted hard copy drawings directly from the "electronic drawing files" and copy for quantities and sizes indicated in the distribution list at the end of this specification section. The Designers of Record shall stamp, sign and date original hard copy sheets as Released For Construction, and provide copies for distribution from this set.

3.7.2. Design Analyses

3.7.2.1. The designers of record shall update, finalize and present design analyses with calculations necessary to substantiate and support all design documents submitted.

3.7.2.2. The responsible DOR shall stamp, sign and date the design analysis. Identify the software used where, applicable (name, version, vendor). Generally, provide design analyses, individually, in an original (file copy) and one copy for the assigned government reviewer.

3.7.2.3. All disciplines review the LEED design analysis in conjunction with their discipline-specific design analysis; include a copy of the separable LEED design analysis in all design analysis submittals.

3.7.2.4. Do not combine multi-disciplined volumes of design-analysis, unless multiple copies are provided to facilitate multiple reviewers (one copy per each separate design analysis included in a volume).

3.7.3. Specifications

Specifications shall be 100% complete and in final form.

3.7.4. Submittal Register

Prepare and update the Submittal Register and submit it with the 100% design specifications (see Specification Section 01 33 00, SUBMITTAL PROCEDURES) with each design package. Include the required submittals for each specification section in a design package in the submittal register.

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

This form itemizes the types, quantities and costs of various equipment and systems that comprise the project, for the purpose of transferring the new construction project from the Corps Construction Division to the Installation's inventory of real property. The Government will furnish the DB Contractor's design manager a DD Form 1354 checklist to use to produce a draft Form 1354. Submit the completed checklist and prepared draft Form DD 1354 with the 100% design in the Design Analysis. The Corps will use these documents to complete the final DD 1354 upon completion of construction.

3.7.6. Acceptance and Release for Construction

3.7.6.1. At the conclusion of the Final Design Review (after resolutions to the comments have been agreed upon between DOR and Government reviewers), the Contracting Officer or the ACO will accept the Final Design Submission for the design package in writing and allow construction to start for that design package. The Government may withhold acceptance until all major corrections have been made or if the final design submission requires so many corrections, even though minor, that it isn't considered acceptably complete.

3.7.6.2. Government review and acceptance of design submittals is for contract conformance only and shall not relieve the Contractor from responsibility to fully adhere to the requirements of the contract, including the Contractor's accepted contract proposal, or limit the Contractor's responsibility of design as prescribed under Special Contract Requirement: "Responsibility of the Contractor for Design" or limit the Government's rights under the terms of the contract. The Government reserves the right to rescind inadvertent acceptance of design submittals containing contract deviations not separately and expressly identified in the submittal for Government consideration and approval.

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

After the Final Design Submission and Review Conference and after Government acceptance of the Final Design submission, revise the design documents for the design package to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents. Label the final design complete documents "FOR CONSTRUCTION" or use similar language. In addition to the final drawings and specifications, the following deliverables are required for distribution and field use. The deliverable includes all documentation and supporting design analysis in final form, as well as the final review comments, disposition and the back-check. As part of the quality assurance process, the Government may perform a back-check of the released for construction documentation. Promptly correct any errors or omissions found during the Government back-check. The Government may withhold retainage from progress payments for work or materials associated with a final design package until this submittal has been received and the Government determines that it is complete.

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

General: The documents which the Contractor shall submit to the Government for each submittal are listed and generally described in preceding paragraphs in this Section. Provide copies of each design submittal and design substantiation as follows (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order):

Activity and Address	Drawing Size (Full Size) Full Size Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) Half Size Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF& <u>.dgn</u>)	Furniture Submittal (FFE)	Structural Interior Design Submittal	BIM Data DVD (Per Attach F)
Commander, U.S.Army Engineer District Charleston District	2/2	2/2	2/2	2	1	1	2
Commander, U.S.Army Engineer District, Center of Standardization Fort Worth	1/1	1/1	1/1	2	1	1	1
Installation	8/8	8/2	2/2	2	2	2	1
U.S.Army Corps of Engineers Construction Area Office	2/2	3/3	6/6	3	3	3	3
Information Systems Engineering Command (ISEC)	0/0	0/1	0/0	1	1 (Electronic only)	N/A	1
Other Offices	2/2	4/4	4/4	0	0	0	0

***NOTE: For partial sets of drawings, specifications and design analyses, see paragraph 3.9.3.3, below.**

****NOTE: When specified below in 3.9.2, furnish Installation copies of Drawings as paper copies, in lieu of the option to provide secure web-based submittals.**

3.9.2. Web based Design Submittals

Web based design submittals will be acceptable as an alternative to the paper copies listed in the Table above, provided a single hard-copy PDF based record set is provided to the Contracting Officer for record purposes. Where the contract requires the Contractor to submit documents to permitting authorities, still provide those authorities paper copies (or in an alternate format where required by the authority). Web based design submittal information shall be provided with adequate security and availability to allow unlimited access those specifically authorized to Government reviewers while preventing unauthorized access or modification. File sizes must be of manageable size for reviewers to quickly download or open on their computers. As a minimum, drawings shall be full scale on American National Standards Institute (ANSI) D sheets (34" x 22"). In addition to the optional website, provide the BIM data submission on DVD to each activity and address noted above in paragraph 3.9.1 for each BIM submission required in Attachment F.

3.9.3. Mailing of Design Submittals

3.9.3.1. Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract (or individual task order if this is an indefinite delivery/indefinite quantity, task order contract). Mail the submittals to five (5) different addresses. Assemble drawing sheets, specs, design analyses, etc. into individual sets; do not combine duplicate pages from individual sets so that the government has to assemble a set.

3.9.3.2. Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

3.9.3.3. Provide partial sets of drawings, specifications, design analyses, etc., as designated in the Table in paragraph 3.9.1, to those reviewers who only need to review their applicable portions of the design, such as the various utilities. The details of which office receives what portion of the design documentation will be worked out after award.

3.10. AS-BUILT DOCUMENTS

Provide as-built drawings and specifications in accordance with Section 01 78 02.00 10, CLOSEOUT SUBMITTALS. Update LEED design phase documentation during construction as needed to reflect construction changes and advancing project completion status (example - Commissioning Plan updates during construction phase) and include updated LEED documentation in construction closeout submittal.

ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

1.0 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. Develop the SID in conjunction with the furniture footprint.

2.0 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

2.1. FORMAT AND SCHEDULE

Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the Contractor may proceed to final design with the interior finishes scheme presented.

The SID information and samples are to be submitted in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Structural Interior Design" package. Include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Design submittal requirements include, but are not limited to:

2.1.1. Narrative of the Structural Interior Design Objectives

The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.

2.1.2. Interior Color Boards

Identify and key each item on the color boards to the contract documents to provide a clear indication of how and where each item will be used. Arrange finish samples to the maximum extent possible by room type in order to illustrate room color coordination. Label all samples on the color boards with the manufacturer's name, patterns and colors name and number. Key or code samples to match key code system used on contract drawings.

Material and finish samples shall indicate true pattern, color and texture. Provide photographs or colored photocopies of materials or fabrics to show large overall patterns in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.

Color boards shall include but not be limited to original color samples of the following:

All walls finishes and ceiling finishes, including corner guards, acrylic wainscoting and wall guards/chair rail finishes

All tile information, including tile grout color and tile patterns.

- All flooring finishes, including patterns.
- All door, door frame finishes and door hardware finishes
- All signage, wall base, toilet partitions, locker finishes and operable/folding partitions and trim

- All millwork materials and finishes (cabinets, counter tops, etc.)
- All window frame finishes and window treatments (sills, blinds, etc.)

Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

2.1.3. Exterior Color Boards

Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. Provide original color samples of all exterior finishes including but not limited to the following:

- All Roof Finishes
- All Brick and Cast Stone Samples
- All Exterior Insulation and Finish Samples
- All Glass Color Samples
- All Exterior Metals Finishes
- All Window & Door Frame Finishes
- All Specialty Item Finishes, including trim

Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

2.2. STRUCTURAL INTERIOR DESIGN DOCUMENTS

2.2.1. General

Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

2.2.2. Finish Color Schedule

Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations. Key the finish code to the color board samples and drawings.

2.2.3. Interior Finish Plans

Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.

2.2.4. Furniture Footprint Plans

Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

2.2.5. Interior Signage

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

2.2.6. Interior Elevations, Sections and Details

Indicate material, color and finish placement.

ATTACHMENT B
FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS

1.0 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

1.1. FORMAT AND SCHEDULE

Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The Contractor's interior designer, not a furniture dealer, shall develop the design. FF&E is the selection, layout, specification and documentation of furniture includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the Structural Interior Design (SID) portion of the interior design. Develop the FF&E package concurrently with the building design to ensure that there is coordination between the electrical outlets, switches, J-boxes, communication outlets and connections, and lighting as appropriate. In addition, coordinate layout with other building features such as architectural elements, thermostats, location of TV's, GF/GI equipment (for example computers, printers, copiers, shredders, faxes), etc. Locate furniture in front of windows only if the top of the item falls below the window and unless otherwise noted, do not attach furniture including furniture systems to the building. If project has SIPRNET and/or NIPRNET, coordinate furniture layout with SIPRNET and NIPRNET separation requirements. Verify that access required by DOIM for SIPRNET box and conduit is provided. The DOR shall interview appropriate Government personnel to determine FF&E requirements for furniture and furnishings prior to preparation of the scheme to be presented. Determine FFE items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade. Present original sets of the scheme to reviewers at an interim design conference upon completion of the interim architectural submittal or three months prior to the submittal of the final FF&E package (whichever comes first).

Design may proceed to final with the FF&E scheme presented at the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers.

Provide six copies of the electronic versions of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide unbound, electronic drawings in CAD and BIM. Provide all files needed to view complete drawings. Submit all text documents in Microsoft Word or Excel..

Submit three copies of the final and complete FF&E information and samples in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first). Use more than one binder when there are numerous pages with thick samples. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out for upholstery and finish boards. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Provide electronic copies of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide six compact disks with all drawings files needed to view the complete drawings unbound and in the latest version AutoCAD. Provide six additional compact disks of all text documents in Microsoft Word or Excel.

Design submittal requirements include, but are not limited to:

1.1.1. Narrative of Interior Design Objectives

Provide a narrative description of the furniture, to include functional, safety and ergonomic considerations, durability, sustainability, aesthetics, and compatibility with the building design.

1.1.2. Furniture Order Form

Prepare one Furnishings Order Form for each item specified in the design. This form identifies all information required to order each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:

- (a) Furniture item illustration and code
- (b) Furniture item name
- (c) Job name, location, and date
- (d) General Services Administration (GSA) FSC Group, part, and section
- (e) Manufacturer, Product name and Product model number or National Stock Number (NSN)
- (f) Finish name and number (code to finish samples)
- (g) Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)
- (h) Dimensions
- (i) Item location by room number and room name
- (j) Quantity per room
- (k) Total quantity
- (l) Special instructions for procurement ordering and/or installation (if applicable)
- (m) Written Product Description: include a non-proprietary paragraph listing the salient features of the item to include but not limited to:
 - (1) required features and characteristics
 - (2) ergonomic requirements
 - (3) functional requirements
 - (4) testing requirements
 - (5) furniture style
 - (6) construction materials
 - (7) minimum warranty

The following is an example for “m” features and characteristics, ergonomic requirements and functional requirements:

Chair Description:

- (1) Mid-Back Ergonomic Task Chair
- (2) Pneumatic Gaslift; Five Star Base
- (3) Mesh Back; Upholstered Seat
- (4) Height and Width Adjustable Task Arms:
 - a. Arm Height: 6”- 11” (+-1/2”)
 - b. Arm Width: 2”– 4” adjustment
- (5) Height Adjustable Lumbar Support
- (6) Adjustable Seat Height 16”-21” (+- 1”)
- (7) Sliding Seat Depth Adjustment 15”-18” (+-1”)
- (8) Standard Hard Casters (for carpeted areas)
- (9) Overall Measurements:
 - a. Overall width: 25” - 27”
 - b. Overall depth: 25”– 28”

(10) Must have a minimum of the following adjustments (In addition to the above):

- a. 360 Degree Swivel
- b. Knee-Tilt with Tilt Tension
- c. Back angle
- d. Forward Tilt
- e. Forward Tilt and Upright Tilt Lock

For projects with systems furniture, also provide a written description of the following minimum requirements:

- (1) Type furniture systems (panel, stacking panels, spine wall, desk based system, or a combination)
- (2) Minimum noise reduction coefficient (NRC)
- (3) Minimum sound transfer coefficient (STC)
- (4) Minimum flame spread and smoke development
- (5) UL testing for task lighting and electrical system
- (6) Panel widths and heights and their locations (this may be done on the drawings) Worksurface types and sizes (this may be done on the drawings)
- (7) Worksurface edge type
- (8) Varying panel/cover finish materials and locations (locations may be shown on the drawings)
- (9) Storage requirements
- (10) Keyboard requirements
- (11) Lock and keying requirements
- (12) Accessory components (examples: tack boards, marker boards, paper management)
- (13) Electrical and communication raceway requirement; type, capacity and location (base, beltline, below and/or above beltline)
- (14) Locations of communication cables (base, beltline, below and/or above beltline, top channel)
- (15) Types of electrical outlets
- (16) Types of communication jacks; provided and installed by others
- (17) Locations of electrical outlets and communication jacks (this may be done on the drawings)
- (18) Type of cable (examples: Cat. 5, Cat. 6, fiber optic; UTP or STP, etc.) system needs to support; provided and installed by others

1.1.3. Alternate Manufacturer List

Provide a table consisting of major furniture items that lists the manufacturers products specified on the Order Form and two alternate manufacturers. Major furniture items include, but are not limited to, casegoods, furniture systems, seating, and tables. Organize matrix by item code and item name. Supply alternates that are available on GSA Schedule and meet the requirements of the Furniture Order Form. One of the two alternates must be from UNICOR if possible. Provide manufacturer name address, telephone number, product series and product name for each alternate manufacturer.

1.1.4. FF&E Procurement List

Provide a table that lists all FF&E furniture, mission unique equipment and building Contractor Furnished/Contractor Installed (CF/CI) items. Give each item a code and name and designate whether item will be procured as part of the FF&E furniture, mission unique equipment or the building construction contract. Use the item code to key all FF&E documents including location plans, color boards, data sheets, cost estimate, etc.

1.1.5. Points of Contact (POCs)

Provide a comprehensive list of POCs needed to implement the FF&E package. This would include but not be limited to appropriate project team members, using activity contacts, interior design representatives, construction contractors and installers involved in the project. In addition to name, address, phone, fax and email, include each contact's job function. Divide the FF&E package into different sections based on this listing, applies to order forms and cost estimates.

1.1.6. Color Boards

Provide color boards for all finishes and fabrics for all FF&E items. Finishes to be included but not limited to paint, laminate, wood finish, fabric, etc.

1.1.7. Itemized Furniture Cost Estimate

Provide an itemized cost estimate of furnishings keyed to the plans and specifications of products included in the package. This cost estimate should be based on GSA price schedules. The cost estimate must include separate line items for general contingency, installation, electrical hook-up for systems furniture or other furniture requiring hardwiring by a licensed electrician, freight charges and any other related costs. Installation and freight quotes from vendors should be use in lieu of a percentage allowance when available. Include a written statement that the pricing is based on GSA schedules. An estimate developed by a furniture dealership may be provided as support information for the estimate, but must be separate from the contractor provided estimate.

1.2. INTERIOR DESIGN DOCUMENTS

1.2.1. Overall Furniture and Area Plans

Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. Key all the items on the drawings by furniture item code. Do not provide manufacturer specific information such as product names and numbers on drawings, Drawings shall be non-proprietary. This is typical for FFE on all plans, including those mentioned below.

1.2.2. Workstation Plans

Show each typical workstation configuration in plan view, elevations or isometric view. Drawings shall illustrate panels and all major components for each typical workstation configuration. Identify workstations using the same numbering system as shown on the project drawings. Key components to a legend on each sheet which identifies and describes the components along with dimensions. Provide the plan, elevations and isometric of each typical workstation together on the same drawing sheet.

1.2.3. Panel Plans

Show panel locations and critical dimensions from finished face of walls, columns, panels including clearances and aisle widths. Key panel assemblies to a legend which shall include width, height, configuration of frames, panel fabric and finishes (if there are different selections existing within a project), powered or non-powered panel and wall mount locations.

1.2.4. Desk Plans

Provide typical free standing desk configurations in plan view, elevation or isometric view and identify components to clearly represent each desk configuration.

1.2.5. Reflected Ceiling Plans

Provide typical plans showing ceiling finishes and heights, lighting fixtures, heating ventilation and air conditioning supply and return, and sprinkler head placement for coordination of furniture.

1.2.6. Electrical and Telecommunication Plans

Show power provisions including type and locations of feeder components, activated outlets and other electrical components. Show locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

1.2.7. Artwork Placement Plans

Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

1.2.8. Window Drapery Plans

Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

1.3. FURNITURE SELECTION

1.3.1. Select furniture from the GSA Schedules. Specify furniture available open market when an item is not available on the GSA Schedules. Provide justification for items not available on the GSA Schedules.

1.3.2. To the greatest extent possible when specifying furniture work within a manufacturer's family of furniture for selections, example: Steelcase, Turnstone, Brayton International, Metro, and Vecta are all Steelcase companies. Each alternate should also be specified from a manufacturer's family of furniture, example: first set of alternates would be specified from Knoll's family of furniture and the second from Herman Miller family of furniture. It may be necessary to make some selections from other than a manufacturer's family of furniture if costs are not reasonable for particular items, some items are not available or appropriate for the facility or the items are not on GSA Schedule. If this occurs, consider specifying product from an open line that is accessible by numerous dealerships. Select office furniture including case goods, tables, storage, seating, etc. that is compatible in style, finish and color. Select furniture that complies with ANSI/BIFMA and from manufacturer's standard product line as shown in the most recent published price list and/or amendment and not custom product.

1.4. CONSTRUCTION

1.4.1. Provide knee space at workstations and tables that is not obstructed by panels/legs that interfere with knee space of seated person and provide desks, storage and tables with leveling devices to compensate for uneven floors.

1.4.2. Provide worksurface tops constructed to prevent warpage. Provide user friendly features such as radius edges. Do not use sharp edges and exposed connections and ensure the underside of desks, tables and worksurfaces are completely and smoothly finished. Provide abutting worksurfaces that mate closely and are of equal heights when used in side-by-side configurations in order to provide a continuous and level worksurface.

1.4.3. Drawers shall stay securely closed when in the closed position and protect wires from damage during drawer operation. Include a safety catch to prevent accidental removal when fully open

1.4.4. Unless otherwise noted, specify lockable desks and workstations and storage of steel construction. Use tempered glass glazing when glazing is required.

1.5. FINISHES AND UPHOLSTERY

1.5.1. Specify neutral colors for casegoods, furniture systems, storage and tables. Specify desk worksurfaces and table tops that are not too light or too dark in color and have a pattern to help hide soiling. Accent colors are allowed in break and lounge areas. Keep placement of furniture systems panel fabric accent colors to a minimum. All finishes shall be cleanable with ordinary household cleaning solutions.

1.5.2. Use manufacturer's standard fabrics; including textile manufacturers fabrics that have been graded into the furniture manufacturers fabric grades and are available through their GSA Schedule. Customers Own Material

(COM) can be used in headquarter buildings in command suites with executive furniture. Coordinate specific locations with Corps of Engineers Interior Designer.

1.5.3. Specify seating upholstery that meets Wyzenbeek Abrasion Test, 55,000 minimum rubs. Specify a soil retardant finish for woven fabrics if Crypton or vinyl upholstery is not provided for seating in dining areas. Use manufacturer's standard fabrics. This includes textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Specify upholstery and finish colors and patterns that help hide soiling. Specify finishes that can be cleaned with ordinary household cleaning solutions.

1.6. ACCESSORIES

1.6.1. Specify all accessories required for completely finished furniture installation. Provide filing cabinets and storage for office supplies. Provide tack surfaces at workstations with overhead storage. Provide tackable surfaces at workstations with overhead storage.

1.6.2. Not Used.

1.6.3. Workstations are to be equipped with stable keyboard trays that have height adjustability, tilting capability, including negative tilt, have a mouse pad at same height as the keyboard tray that can accommodate both left and right handed users, and retractable under worksurface.

1.7. MISSION UNIQUE EQUIPMENT

Funding for FF&E furniture items and mission unique equipment (MUE) items are from two different sources. Separate the designs and procurement documentation for FFE items and MUE. MUE includes, but is not limited to, items such as industrial shelving, workbenches, appliances, fitness equipment, IT equipment and supporting carts. The User will purchase and install mission unique equipment items, unless otherwise noted. Identify locations of known MUE items such as industrial shelving, workbenches, appliances, etc. for space planning purposes.

1.8. SUSTAINABILITY

1.8.1. For all designs provided regardless of facility type, make every effort to implement all aspects of sustainability to the greatest extent possible for all the selections made in the FF&E package. This includes but is not limited to the selection of products that consider: **Material Chemistry and Safety of Inputs** (What chemicals are used in the construction of the selections?); **Recyclability** (Do the selections contain recycled content?); **Disassembly** (Can the selections be disassembled at the end of their useful life to recycle their materials?).

1.8.2. Make selections to the greatest extent possible of products that possess current McDonough Braungart Design Chemistry ([MBDC](#)) certification or other "third-party" certified Cradle to Cradle program, Forest Stewardship Council (FSC) certification, GREENGAURD certification or similar "third-party" certified products consisting of low-emitting materials.

1.9. FURNITURE SYSTEMS

1.9.1. General.

Where appropriate, design furniture systems in open office areas. Coordinate style and color of furniture systems with other storage, seating, etc. in open office areas. Minimize the number of workstation typicals and the parts and pieces required for the design to assist in future reconfiguration and inventorying.

1.9.2. Connector Systems.

Specify a connector system that allows removal of a single panel or spine wall within a typical workstation configuration without requiring disassembly of the workstation or removal of adjacent panels. Specify connector system with tight connections and continuous visual seals. When Acoustical panels are used, provide connector system with continuous acoustical seals. Specify concealed clips, screws, and other construction elements, where possible.

1.9.3. Panels and Spine Walls

Specify panels and spine walls with hinged or removable covers that permit easy access to the raceway when required but are securely mounted and cannot be accidentally dislodged under normal conditions. Panels shall be capable of structurally supporting more than 1 fully loaded component per panel per side. Raceways are to be an integral part of the panel and must be able to support lay-in cabling and have a large capacity for electrical and IT. Do not thread cables through the frame.

1.9.4. Electrical And Information/Technology (IT)

Design furniture with electrical systems that meets requirements of UL 1286 when powered panels are required and UL approved task lights that meet requirements of NFPA 70. Dependent on user requirements and Section 01 10 00, paragraph 3 requirements, it is recommended that workstation electrical and IT wiring entry come from the building walls to eliminate the use of power poles and access at the floor. Design electrical and IT systems that are easily accessed in the spine wall and panels without having to move return panels and components. Electrical and IT management will be easily accessible by removable wall covers which can be removed while workstation components are still attached. Specify connector system that has continuation of electrical and IT wiring within workstations and workstation to workstation.

1.9.5. Pedestals

Specify pedestals that are interchangeable from left to right, and right to left, and retain pedestal locking system capability.

1.10. EXECUTIVE FURNITURE

1.10.1. Design for executive furniture in command areas, coordinate specific locations with Corps of Engineers Interior Designer. Use upgraded furniture, upholsteries and finishes in command suites. This includes but is not limited to wood casegoods, seating and tables. Select executive furniture casegoods from a single manufacturer and style line, to include workstations, credenzas, filing, and storage, etc.

1.10.2. Specify furniture with wood veneer finish (except worksurfaces) with mitered solid wood edge of same wood type. Provide worksurface plastic laminate that closely matches adjacent wood veneer. Other executive office furniture such as seating, tables, executive conference room furniture, etc. shall be compatible in style, finish and color with executive furniture casegoods.

1.11. SEATING

1.11.1. General

Specify appropriate chair casters and glides for the floor finish where the seating is located. Universal casters that are appropriate for both hard surface flooring and carpet are preferred. All seating shall support up to a minimum of 250 lbs.

1.11.2. Desk and Guest Seating

Select ergonomic desk chairs with casters, non-upholstered adjustable arms, waterfall front, swivel, tilt, variable back lock, adjustable back height or adjustable lumbar support, pneumatic seat height adjustment, and padded, contoured upholstered seat and back. Desk and guest chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Depending on scale of desk chair provide seat pan forward and back adjustment to increase or decrease depth of seat pan. All desk chairs shall have an adjustable seat height range of 4 1/2", range to include 16 1/2"-20". Select guest chairs that are compatible in style, finish and color with the desk chairs.

1.11.3. Conference Room Seating

At tables, select ergonomic conference seating with casters, non-upholstered arms, waterfall front, swivel, tilt, pneumatic seat height adjustment, and padded, contoured seat and back, unless otherwise noted. Select arm height and/or design that allows seating to be moved up closely to the table top. Conference chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Perimeter conference chairs shall be compatible in style, finish and color with conference seating at the tables.

1.11.4. Lounge, Waiting and Reception Area Seating

Select seating with arms and cushioned, upholstered seat and back. In heavy use areas, arms shall be easily cleaned such as non-upholstered arms or upholstered arms with wood arm caps unless otherwise noted.

1.11.5. Break Room Seating

Select stackable seating that is easily cleaned. Seating shall be appropriate for table and counter heights as applicable with non-upholstered arms if arms are required. Chairs shall have metal legs and composite materials for seats.

1.11.6. Lounge, Waiting and Reception Furniture.

Design for end and coffee tables with plastic laminate tops that are compatible in style finish and color with the seating.

1.12. FILING AND STORAGE.

Select storage and shelving units that meet customer's functional load requirements for stored items. Specify counterweights for filing cabinets when required by the manufacturer for stability. File drawers shall allow only one drawer to be opened at a time. Provide heavy duty storage and shelving if information is not available.

1.13. TRAINING TABLES.

Don't use plastic laminate self edge. Training tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or casters as necessary. Specify dollies if required.

1.14. FURNITURE WARRANTIES.

Specify manufacturer's performance guarantees or warranties that include parts, labor and transportation as follows:

Furniture System, unless otherwise noted – 10 year minimum
Furniture System Task Lights – 2 year minimum, excluding bulbs
Furniture System Fabric – 3 year minimum
Desks - 10 year minimum
Seating, unless otherwise noted - 10 year minimum
Seating Mechanisms and Pneumatic Cylinders - 10 years
Fabric - 3 years minimum
Filing and Storage - 10 year minimum
Tables, unless otherwise noted - 10 year minimum
Table Mechanisms – 5 year
Table Ganging Device - 1 year
Items not listed above - 1 year minimum

ATTACHMENT C

TRACKING COMMENTS IN DRCHECKS

1.0 General

The Government and DB Contractor shall set up the project in Dr Checks. Throughout the design process, the parties shall enter, track, and back-check comments using the DrChecks system. Government reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate exactly what action will be taken or why the action is not required. Comments considered critical by the conference participants shall be flagged as such.

2.0 DrChecks Review Comments

The Contractor and the Government shall monitor DrChecks to assure all comments are annotated and agreed to by the designers and reviewers prior to the next submittal. The DrChecks comments and responses shall be printed and included in the design analysis for record.

2.1. Conference participants (reviewers) will expect coordination between Design Analysis calculations and the submitted design. Reviewers will also focus on the design submittal's satisfaction of the contract requirements.

2.2. The Designers of Record shall answer each comment in DrChecks with a formal response prior to the next submittal, clearly indicating what action will be taken and what drawing/spec will change. Designers of Record are encouraged to directly contact reviewers to discuss and agree to the formal comment responses rather than relying only on DrChecks and review meetings to discuss comments. With the next design conference, reviewers will back-check answers to the comments against the submittal, in addition to reviewing additional design work.

2.3. Comments that, in the DB Contractor's opinion, require effort outside the scope of the contract shall be clearly indicated as such in DrChecks. The DB Contractor shall not proceed with work outside the contract until a modification to the contract is properly executed, if one is necessary.

3.0 DrChecks Initial Account Set-Up

To initialize an office's use of DrChecks, choose a contact person within the office to call the DrChecks Help Desk at 800-428-HELP, M-F, 8AM-5PM, Central time. This POC will be given an office password to distribute to others in the office. Individuals can then go to the hyperlink at <http://www.projnet.org> and register as a first time user. Upon registration, each user will be given a personal password to the DrChecks system.

3.1. Once the office and individuals are registered, the COE's project manager or lead reviewer will assign the individuals and/or offices to the specific project for review. At this point, persons assigned can make comments, annotate comments, and close comments, depending on their particular assignment.

4.0 DrChecks Reviewer Role

The Contractor is the technical reviewer and the Government is the compliance reviewer of the DB designers design documents. Each reviewer enters their own comments into the Dr Checks system. To enter comments:

4.1. Log into DrChecks.

4.2. Click on the appropriate project.

4.3. Click on the appropriate review conference. An Add comment screen will appear.

4.4. Select or fill out the appropriate sections (particularly comment discipline and type of document for sorting) of the comment form and enter the comment in the space provided.

4.5. Click the Add Comment button. The comment will be added to the database and a fresh screen will appear for the next comment you have.

4.6. Once comments are all entered, exit DrChecks by choosing “My Account” and then Logout.

5.0 DrChecks Comment Evaluation

The role of the designers of record is to evaluate and respond to the comments entered by the Government reviewers and by the DB Contractor. To respond to comments:

5.1. Log into DrChecks.

5.2. Click on the appropriate project.

5.3. Under “Evaluate” click on the number under “Pending”.

5.4. Locate the comments that require your evaluation. (Note: If you know the comment number you can use the Quick Pick window on your home page in DrChecks; enter the number and click on go.)

5.5. Select the appropriate evaluation (concur, non-concur, for information only, or check and resolve) and add the response.

5.6. Click on the Add button. The evaluation will be added to the database and a fresh screen will appear with the next comment.

5.7. Once evaluations are all entered, exit DrChecks by choosing “My Account” and then Logout.

6.0 DrChecks Back-check

At the following design conference, participants will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and completed. The Contractor and Government reviewers shall either enter additional back-check comments, as necessary or close those that are resolved as a result of the design conferences:

6.1. Log into DrChecks.

6.2. Click on the appropriate project.

6.3. Under “My Backcheck” click on the number under “Pending”.

6.4. If you agree with the designer's response select “Close Comment” and add a closing response if desired.

6.5. If you do not agree with the designer's response or the submittal does not reflect the response given, select “Issue Open”, enter additional information.

6.6. Click on the Add button. The back-check will be added to the database and a fresh screen will appear with the next comment.

6.7. Once back-checks are all entered, exit DrChecks by choosing “My Account” and then Logout. The design is completed and final when there are no pending comments to be evaluated and there are no pending or open comments under back-check.

ATTACHMENT D
SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

Instructions: Use the information outlined in this document to provide the minimum requirement for development of Fire Protection and Life Safety Code submittals for all building projects. Additional and supplemental information may be used to further develop the code review. Insert N/A after criteria, which may be "not applicable".

1.0 SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

- 1.1. Project Name (insert name and location)
- 1.2. Applicable Codes and Standards
 - 1.2.1. Unified Facilities Criteria (UFC): 3-600-01, Design: Fire Protection Engineering For Facilities
 - 1.2.2. International Building Code (IBC) for fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements, except as modified by UFC 3-600-01.
 - 1.2.3. National Fire Protection Association (NFPA) 101 Life Safety Code (latest edition), for building egress and life safety and applicable criteria in UFC 3-600-01.
 - 1.2.4. ADA and ABA Accessibility Guidelines. For Buildings and Facilities See Section 01 10 00, Paragraph 3 for facility specific criteria.
- 1.3. Occupancy Classification
IBC chapters 3 and 4
- 1.4. Construction Type
IBC chapter 6
- 1.5. Area Limitations
IBC chapter 5, table 503
- 1.6. Allowable Floor Areas
IBC section 503, 505
- 1.7. Allowable area increases
IBC section 506, 507
- 1.8. Maximum Height of Buildings
IBC section 504
- 1.9. Fire-resistive substitution
- 1.10. Occupancy Separations
IBC table 302.3.2
- 1.11. Fire Resistive Requirements
 - 1.11.1. Exterior Walls - [] hour rating, IBC table 601, 602
 - 1.11.2. Interior Bearing walls - [] hour rating
 - 1.11.3. Structural frame - [] hour rating
 - 1.11.4. Permanent partitions - [] hour rating

- 1.11.5. Shaft enclosures - [] hour rating
- 1.11.6. Floors & Floor-Ceilings - [] hour rating
- 1.11.7. Roofs and Roof Ceilings - [] hour rating
- 1.12. Automatic Sprinklers and others used to determine the need for automatic Extinguishing Equipment, Extinguishing Systems, Foam Systems, Standpipe
 - 1.12.1. UFC 3-600-01, chapters 4 and 6 systems, wet chemical systems, etc. State which systems are required and to what criteria they will be designed.
 - 1.12.2. UFC 3-600-01, Appendix B Occupancy Classification. Note the classification for each room. This may be accomplished by classifying the entire building and noting exceptions for rooms that differ (E.g. The entire building is Light Hazard except boiler room and storage rooms which are [], etc.)
 - 1.12.3. UFC 3-600-01, Chapter 3 Sprinkler Design Density, Sprinkler Design Area, Water Demand for Hose Streams (supply pressure and source requirements).
 - 1.12.4. UFC 3-600-01, Chapter 4 Coverage per sprinkler head. Extended coverage sprinkler heads are not permitted.
 - 1.12.5. Available Water Supply. Provide the results of the water flow tests showing the available water supply static pressure and residual pressure at flow. Based on this data and the estimated flow and pressure required for the sprinkler system, determine the need for a fire pump.
 - 1.12.6. NFPA 13, Para. 8.16.4.6.1. Provide backflow preventer valves as required by the local municipality, authority, or water purveyor. Provide a test valve located downstream of the backflow preventer for flow testing the backflow preventer at full system demand flow. Route the discharge to an appropriate location outside the building.
- 1.13. Kitchen Cooking Exhaust Equipment
Describe when kitchen cooking exhaust equipment is provided for the project. Type of extinguishing systems for the equipment should be provided. per NFPA 96. Show all interlocks with manual release switches, fuel shutoff valves, electrical shunt trips, exhaust fans, and building alarms.
- 1.14. Portable Fire Extinguishers, fire classification and travel distance. per NFPA 10
- 1.15. Enclosure Protection and Penetration Requirements. - Opening Protectives and Through Penetrations
 - 1.15.1. IBC Section 712, 715 and Table 715.3. Mechanical rooms, exit stairways, storage rooms, janitor [] hour rating. IBC Table 302.1.1
 - 1.15.2. Fire Blocks, Draft Stops, Through Penetrations and Opening Protectives
- 1.16. Fire Dampers. Describe where fire dampers and smoke dampers are to be used (IBC Section 716 and NFPA 90A). State whether isolation smoke dampers are required at the air handler.
- 1.17. Detection Alarm and Communication. UFC 3-600-01, (Chapter 5); NFPA 101 para. 3.4 (chapters 12-42); NFPA 72
- 1.18. Mass Notification. Describe building/facility mass notification system (UFC 4-021-01) type and type of base-wide mass notification/communication system. State whether the visible notification appliances will be combined with the fire alarm system or kept separate. (Note: Navy has taken position to combine visible notification appliances with fire alarm).
- 1.19. Interior Finishes (classification). NFPA 101.10.2.3 and NFPA 101.7.1.4
- 1.20. Means of Egress

- 1.20.1. Separation of Means of Egress, NFPA 101 chapters 7 and 12-42; NFPA101.7.1.3
- 1.20.2. Occupant Load, NFPA101.7.3.1 and chapters 12-42.
- 1.20.3. Egress Capacity (stairs, corridors, ramps and doors) NFPA101.7.3.3
- 1.20.4. Number of Means of Egress, NFPA101.7.4 and chapters 12-42.
- 1.20.5. Dead end limits and Common Path of Travel, NFPA 101.7.5.1.6 and chapters 12-42.
- 1.20.6. Accessible Means of Egress (for accessible buildings), NFPA101.7.5.4
- 1.20.7. Measurement of Travel Distance to Exits, NFPA101.7.6 and chapters 12-42.
- 1.20.8. Discharge from Exits, NFPA101.7.7.2
- 1.20.9. Illumination of Means of Egress, NFPA101.7.8
- 1.20.10. Emergency Lighting, NFPA101.7.9
- 1.20.11. Marking of Means of Egress, NFPA101.7.10
- 1.21. Elevators, UFC 3-600-01, Chapter 6; IBC and ASME A17.1 - 2000,(Safety Code for Elevators and Escalators)
- 1.22. Accessibility Requirements, ADA and ABA Accessibility Guidelines for Buildings and Facilities
- 1.23. Certification of Fire Protection and Life Safety Code Requirements. (Note: Edit the Fire team membership if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features for this project in accordance with the attached completed form(s).
- 1.24. Designer of Record. Certification of Fire protection and Life Safety Code Requirements. (Note: Edit the Fire team members if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features of this project.

Fire Protection Engineer of Record:

Signature and Stamp

Date

OR

Architect of Record:

Signature and Stamp

Date

Mechanical Engineer of Record:

Signature and Stamp

Date

Electrical Engineer of Record:

Signature/Date

ATTACHMENT E
LEED SUBMITTALS

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
GENERAL						
		GENERAL - All calculations shall be in accordance with LEED 2009 Reference Guide.				
		GENERAL: Obtain excel version of this spreadsheet at http://en.sas.usace.army.mil/enWeb/EngineeringCriteria .				
		GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach.				
		GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only.				
		NOTE: Each submittal indicated with "****" differs from LEED certified project submittals by either having a different due date or being an added submittal not required by GBCI.				
		NOTE: Projects seeking LEED certification need only submit to GBCI whatever documentation is acceptable to GBCI (for example, licensed professional certifications). This checklist identifies what must be submitted to the Government for internal review purposes. Government review of LEED documentation in no way supercedes or modifies the requirements and rulings of GBCI for purposes of compliance with project requirement to obtain LEED certification.				
		GENERAL - Audit documentation may include but is not limited to what is indicated in this table.				
			Closeout	List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents.		Proj Engr (PE)
CATEGORY 1 - SUSTAINABLE SITES						
SSPR1		Construction Activity Pollution Prevention (PREREQUISITE)	**Final Design	List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design	Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program.		CIV
SS1		Site Selection	Final Design	Statement confirming that project does not meet any of the prohibited criteria.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	LEED Site plan drawing that shows all proposed development, line depicting boundary of all bodies of water and/or wetlands within 100 feet of project boundary and a line depicting 5' elevation above 100 year flood line that falls within project boundary. Not required if neither condition applies.		CIV
SS2		Development Density & Community Connectivity	Final Design	Option 1: LEED Site vicinity plan showing project site and surrounding development. Show density boundary or note drawing scale.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Table indicating, for project site and all surrounding sites within density radius (keyed to site vicinity plan), site area and building area. Project development density calculation. Density radius calculation. Development density calculation within density radius.		CIV
			Final Design	Option 2: LEED Site vicinity plan showing project site, the 1/2 mile community radius, pedestrian walkways and the locations of the residential development(s) and Basic Services surrounding the project site.		CIV
			Final Design	Option 2: List (including business name and type) of all Basic Services facilities within the 1/2 mile radius, keyed to site vicinity plan.		CIV
SS3		Brownfield Redevelopment	Final Design	Narrative describing contamination and the remediation activities included in project. Include statement indicating how site was determined to be a brownfield.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS4.1		Alternative Transportation: Public Transportation Access	Final Design	Statement indicating which option for compliance applies. State whether public transportation is existing or proposed and, if proposed, cite source of this information.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: LEED Site vicinity plan showing project site, mass transit stops and pedestrian path to them with path distance noted.		CIV
			Final Design	Option 2: LEED Site vicinity plan showing project site, bus stops and pedestrian path to them with path distance noted.		CIV
SS4.2		Alternative Transportation: Bicycle Storage & Changing Rooms	Final Design	FTE calculation. Bicycle storage spaces calculation. Shower/changing facilities calculation.		CIV
			Final Design	List of drawings that show the location(s) of bicycle storage areas. Statement indicating distance from building entrance.		CIV
			Final Design	List of drawings that show the location(s) of shower/changing facilities and, if located outside the building, statement indicating distance from building entrance.		CIV

Thursday, May 27, 2010

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
SS4.3		Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	Final Design	Statement indicating which option for compliance applies. FTE calculation. Statement indicating total parking capacity of site.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Low-emission & fuel-efficient vehicle calculation.		CIV
			Final Design	Option 1: List of drawings and specification references that show location and number of preferred parking spaces for low-emission & fuel-efficient vehicles and signage.		CIV
			Final Design	Option 1: Statement indicating quantity, make, model and manufacturer of low-emission & fuel-efficient vehicles to be provided. Statement confirming vehicles are zero-emission or indicating ACEEE vehicle scores.		CIV
			Final Design	Option 2: Low-emission & fuel-efficient vehicle parking calculation.		CIV
			Final Design	Option 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design	Option 3: Low-emission & fuel-efficient vehicle refueling station calculation.		CIV
			Final Design	Option 3: List of drawings and specifications indicating location and number of refueling stations, fuel type and fueling capacity for each station for an 8-hour period.		CIV
			Closeout	Option 3: Construction product submittals indicating what was provided and confirming compliance with respect to fuel type and fueling capacity for each station for an 8-hour period.		CIV
SS4.4		Alternative Transportation: Parking Capacity	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Preferred parking calculation including number of spaces required, total provided, preferred spaces provided and percentage.		CIV
			Final Design	Option 2: FTE calculation. Preferred parking calculation including number of spaces provided, preferred spaces provided and percentage.		CIV
			Final Design	Options 1 and 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design	Option 3: Narrative indicating number of spaces required and provided and describing infrastructure and support programs with description of project features to support them.		CIV
SS5.1		Site Development: Protect or Restore Habitat	**Final Design	Option 1: List of drawing and specification references that convey site disturbance limits.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design	Option 2: LEED site plan drawing that delineates boundaries of each preserved and restored habitat area with area (sf) noted for each.		CIV
			**Final Design	Option 2: Percentage calculation of restored/preserved habitat to total site area. List of drawings and specification references that convey restoration planting requirements.		CIV
SS5.2		Site Development: Maximize Open Space	Final Design	Option 2: LEED site plan drawing delineating boundary of vegetated open space adjacent to building with areas of building footprint and designated open space noted.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS6.1		Stormwater Design: Quantity Control	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf) -OR - Narrative describing site conditions, measures and controls to be implemented to prevent excessive stream velocities and erosion.		CIV
			Final Design	Option 2: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf). Indicate percent reduction in each.		CIV
SS6.2		Stormwater Design: Quality Control	Final Design	For non-structural controls, list all BMPs used and, for each, describe the function of the BMP and indicate the percent annual rainfall treated. List all structural controls and, for each, describe the pollutant removal and indicate the percent annual rainfall treated.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS7.1		Heat Island Effect: Non-Roof	**Final Design	LEED site plan drawing indicating locations and quantities of each paving type, including areas of shaded pavement. Percentage calculation indicating percentage of reflective/shaded/open grid area.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV

Thursday, May 27, 2010

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
SS7.2		Heat Island Effect: Roof	Final Design	Option 1: Percentage calculation indicating percentage of SRI compliant roof area. List of drawings and specification references that convey SRI requirements and roof slopes.		ARC
			Final Design	Option 1: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout	Option 1: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X Option 1: Manufacturer published product data or certification confirming SRI		PE
			Final Design	Option 2: Percentage calculation indicating percentage of vegetated roof area.		ARC
			Final Design	Option 3: Combined reflective and green roof calculation.		ARC
			Final Design	Option 3: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout	Option 3: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X Option 3: Manufacturer published product data or certification confirming SRI		PE
SS8		Light Pollution Reduction	Final Design	Interior Lighting: List of drawings and specification references that convey interior lighting requirements (location and type of all installed interior lighting, location of non-opaque exterior envelope surfaces, allowing confirmation that maximum candela value from interior fixtures does not intersect non-opaque building envelope surfaces). - OR - List of drawings and specification references that show automatic lighting controls compliance with credit requirement.		ELEC
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		ELEC
			Final Design	Exterior Lighting: List of drawings and specification references that convey exterior lighting requirements (location and type of all site lighting and building façade/landscape lighting).		ELEC
			Final Design	Exterior Site Lighting Power Density (LPD): Tabulation for exterior site lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all site lighting.		ELEC
			Final Design	Exterior Building Facade/Landscape Lighting Power Density (LPD): Tabulation for exterior building facade/landscape lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all building facade/landscape lighting.		ELEC
			Final Design	Exterior Lighting IESNA Zone: Indicate which IESNA zone is applicable to the project.		ELEC
			Final Design	Exterior Lighting Site Lumen table indicating, for each fixture type, quantity installed, initial lamp lumens per luminaire, initial lamp lumens above 90 degrees from Nadir, total lamp lumens and total lamp lumens above 90 degrees. Percentage of site lamp lumens above 90 degrees from nadir to total lamp lumens.		ELEC
			Final Design	Exterior Lighting Narrative describing analysis used for addressing requirements for light trespass at site boundary and beyond.		ELEC
CATEGORY 2 – WATER EFFICIENCY						
WEPR1		Water Use Reduction: 20% Reduction	Final Design	Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design	Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design	Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC

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			Final Design	Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design	Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Closeout	X Manufacturer published product data or certification confirming fixture water usage.		PE
WE1.1		Water Efficient Landscaping: Reduce by 50%	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Calculation indicating, for baseline and design case, total water applied, total potable water applied, total non-potable water applied. Design case percent potable water reduction. If nonpotable water is used, indicate source of nonpotable water.		CIV
			Final Design	List of landscape plan drawings.		CIV
			Final Design	Narrative describing landscaping and irrigation design strategies, including water use calculation methodology used to determine savings and, if non-potable water is used, specific information about source and available quantity.		CIV
WE1.2		Water Efficient Landscaping: No Potable Water Use or No Irrigation	Same as WE1.1	Same as WE1.1		CIV
WE2		Innovative Wastewater Technologies	Final Design	Statement confirming which option for compliance applies.		MEC
			Final Design	Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design	Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design	Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC
			Final Design	Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design	Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Final Design	Option 1: If onsite non-potable water is used, identify source(s), indicate annual quantity from each source and indicate total annual quantity from all onsite non-potable water sources.		MEC
			Final Design	Option 1: Summary calculation indicating baseline annual water consumption, design case annual water consumption, non-potable annual water consumption and total percentage annual water savings.		MEC
			Final Design	Option 2: Statement confirming on-site treatment of all generated wastewater to tertiary standards and all treated wastewater is either infiltrated or used on-site.		MEC
			Final Design	Option 2: List of drawing and specification references that convey design of on-site wastewater treatment features.		CIV
			Final Design	Option 2: On-site water treatment quantity calculation indicating all on-site wastewater source(s), annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from each source and totals for annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from all sources.		CIV
			Final Design	Option 2: Wastewater summary calculation indicating design case annual flush fixture water usage, annual on-site water treatment and percentage sewage conveyance reduction.		MEC
			Final Design	Narrative describing project strategy for reduction of potable water use for sewage conveyance, including specific information on reclaimed water usage and treated wastewater usage.		MEC
WE3		Water Use Reduction: 30% - 40% Reduction	Same as WEPR1	Same as WEPR1		MEC

CATEGORY 3 – ENERGY AND ATMOSPHERE

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EAPR1		Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	**Final Design	**Owner's Project Requirements document		ALL
			**Final Design	**Basis of Design document for commissioned systems		MEC, ELEC
			**Final Design	**Commissioning Plan		MEC, ELEC
			Closeout	Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout	Commissioning Report		PE
EAPR2		Minimum Energy Performance (PREREQUISITE)	Final Design	Statement listing the mandatory provisions of ASHRAE 90.1 that project meets relative to compliance with this prerequisite and indicating which compliance path was used.		MEC ELEC ARC
			Final Design	Statement indicating which compliance path option applies.		MEC
			Final Design	Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design	Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design	Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design	Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design	Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design	Option 1: Energy type summary listing, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design	Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design	Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design	Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design	Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design	Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design	Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EAPR3		Fundamental Refrigerant Management (PREREQUISITE)	Final Design	Statement indicating which option for compliance applies.		MEC
			Final Design	Option 2: Narrative describing phase out plan, including specific information on phase out dates and refrigerant quantities.		MEC
EA1		Optimize Energy Performance	Final Design	Statement indicating which compliance path option applies.		MEC
			Final Design	Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design	Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design	Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design	Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design	Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design	Option 1: Energy type summary listing, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design	Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design	Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design	Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design	Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design	Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features	MEC
			Final Design	Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)	MEC
EA2.1		On-Site Renewable Energy	Final Design	Statement indicating which compliance path option applies.	ELEC
			Final Design	List all on-site renewable energy sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost. Indicate total annual energy use (all sources), total annual energy cost (all sources) and percent renewable energy cost.	ELEC MEC
			Final Design	Option 1: Indicate, for renewable energy, proposed design total annual energy generated and annual cost.	ELEC MEC
			Final Design	Option 2: Indicate CBECS building type and building gross area. Provide the following CBECS data: median annual electrical intensity, median annual non-electrical fuel intensity, average electric energy cost, average non-electric fuel cost, annual electric energy use and cost, annual non-electric fuel use and cost.	ELEC MEC
			Final Design	Option 2: Narrative describing renewable systems and explaining calculation method used to estimate annual energy generated, including factors influencing performance.	ELEC MEC
EA2.2		On-Site Renewable Energy	Same as EA2.1	Same as EA2.1	ELEC MEC
EA2.3		On-Site Renewable Energy	Same as EA2.1	Same as EA2.1	ELEC MEC
EA3		Enhanced Commissioning	**Final Design	**Owner's Project Requirements document (OPR)	ALL
			**Final Design	**Basis of Design document for commissioned systems (BOD)	ELEC MEC
			**Final Design	**Commissioning Plan	ELEC MEC
			Closeout	Statement confirming all commissioning requirements have been incorporated into construction documents.	PE
			Closeout	**Commissioning Report	PE
			**Final Design	Statement by CxA confirming Commissioning Design Review	
			Closeout	Statement by CxA confirming review of Contractor submittals for compliance with OPR and BOD	PE
			Closeout	**Systems Manual	PE
			Closeout	Statement by CxA confirming completion of O&M staff and occupant training	PE
			Closeout	**Scope of work for post-occupancy review of building operation, including plan for resolution of outstanding issues	PE
			**Predesign	Statement confirming CxA qualifications and contractual relationships relative to work on this project, demonstrating that CxA is an independent third party.	MEC
EA4		Enhanced Refrigerant Management	Final Design	Refrigerant impact calculation table with all building data and calculation values as shown in LEED 2009 Reference Guide Example Calculations	MEC
			Final Design	Narrative describing any special circumstances or explanatory remarks	
			Closeout	X Cut sheets highlighting refrigerant data for all HVAC components.	PE
EA5		Measurement & Verification	Closeout	Statement indicating which compliance path option applies.	PE
			Closeout	Measurement and Verification Plan including Corrective Action Plan	PE
			Closeout	**Scope of work for post-occupancy implementation of M&V plan including corrective action plan.	PE
EA6		Green Power	Closeout	Statement indicating which compliance path option applies.	PE
			Closeout	Option 1: Indicate proposed design total annual electric energy usage	PE
			Closeout	Option 2: Indicate actual total annual electric energy usage	PE
			Closeout	Option 3: Calculation indicating building type, total gross area, median electrical intensity and annual electric energy use	PE

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			Closeout	Green power provider summary table indicating, for each purchase type, provider name, annual quantity green power purchased and contract term. Indicate total annual green power use and indicate percent green power		PE
			Closeout	Narrative describing how Green Power or Green Tags are purchased		PE
CATEGORY 4 – MATERIALS AND RESOURCES						
MRPR1		Storage & Collection of Recyclables (PREREQUISITE)	Final Design	Statement confirming that recycling area will accommodate recycling of plastic, metal, paper, cardboard and glass. Narrative indicating any other materials addressed and coordination with pickup.		ARC
MR1.1		Building Reuse: Maintain 55% of Existing Walls, Floors & Roof	**Final Design	If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design	Spreadsheet listing, for each building structural/envelope element, the existing area and reused area. Total percent reused.		ARC
MR1.2		Building Reuse: Maintain 75% of Existing Walls, Floors & Roof	Same as MR1.1	Same as MR1.1		ARC
MR1.3		Building Reuse: Maintain 95% of Existing Walls, Floors & Roof	Same as MR1.1	Same as MR1.1		ARC
MR1.4		Building Reuse: Maintain 50% of Interior Non-Structural Elements	**Final Design	If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design	Spreadsheet listing, for each building interior non-structural element, the existing area and reused area. Total percent reused.		ARC
MR2.1		Construction Waste Management: Divert 50% From Disposal	**Preconstruction	Waste Management Plan		PE
			**Construction Quarterly and Closeout	Spreadsheet calculations indicating material description, disposal/diversion location (or recycling hauler), weight, total waste generated, total waste diverted, diversion percentage		PE
			**Construction Quarterly and Closeout	Receipts/tickets for all items on spreadsheet		PE
MR2.2		Construction Waste Management: Divert 75% From Disposal	Same as MR2.1	Same as MR2.1		PE
MR3.1		Materials Reuse: 5%	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each reused/salvaged material, material description, source or vendor, cost. Total reused/salvaged materials percentage.		PE
MR3.2		Materials Reuse: 10%	Same as MR3.1	Same as MR3.1		PE
MR4.1		Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each recycled content material, material name/description, manufacturer, cost, post-consumer recycled content percent, pre-consumer recycled content percent, source of recycled content data. Total post-consumer content materials cost, total pre-consumer content materials cost, total combined recycled content materials cost, recycled content materials percentage.		PE
			Final Design or NLT Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	Manufacturer published product data or certification, confirming recycled content percentages in spreadsheet		PE
MR4.2		Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Same as MR4.1	Same as MR4.1		PE
MR5.1		Regional Materials: 10% Extracted, Processed & Manufactured Regionally	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each regional material, material name/description, manufacturer, cost, percent compliant, harvest distance, manufacture distance, source of manufacture and harvest location data. Total regional materials cost, regional materials percentage.		PE
			Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	Manufacturer published product data or certification confirming regional material percentages in spreadsheet		PE

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MR5.2		Regional Materials:20% Extracted, Processed & Manufactured Regionally	Same as MR5.1		Same as MR5.1		PE	
MR6		Rapidly Renewable Materials	Closeout		Statement indicating total materials value and whether default or actual.		PE	
			Closeout		Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage.		PE	
			Final Design		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		ARC	
			Closeout	X	Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet		PE	
MR7		Certified Wood	Closeout		Statement indicating total materials value and whether default or actual.		PE	
			Closeout		Spreadsheet calculations indicating, for each certified wood material, material name/description, vendor, cost, wood component percent, certified wood percent of wood component, FSC chain of custody certificate number. Total certified wood product value, certified wood materials percentage.		PE	
			Final Design or NLT Preconstruction		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE	
			Closeout	X	Vendor invoices, FSC chain of custody certificates and anufacturer published product data or certification confirming all certified wood materials percentages in spreadsheet.		PE	
INDOOR ENVIRONMENTAL QUALITY								
EQPR1		Minimum IAQ Performance (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		MEC	
			Final Design		Narrative describing the project's ventilation design, including specifics about fresh air intake volumes and special considerations.		MEC	
EQPR2		Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		ARC	
			Final Design		List of drawing and specification references that convey conformance to applicable requirements (signage, exhaust system, room separation details, etc).		ARC	
EQ1		Outdoor Air Delivery Monitoring	Final Design		Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC	
			Final Design		List of drawing and specification references that convey conformance to applicable requirements.		MEC	
			Final Design		Narrative describing the project's ventilation design and CO2 monitoring system, including specifics about monitors, operational parameters and setpoints.		MEC	
			Closeout	X	Cut sheets for CO2 monitoring system.		PE	
EQ2		Increased Ventilation	Final Design		Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC	
			Final Design		Narrative describing the project's ventilation design, including specifics about zone fresh air intake volumes and demonstrating compliance.		MEC	
			Final Design		Option 2: Narrative describing design method used for determining natural ventilation design, including calculation methodology/model results and demonstrating compliance.		MEC	
			Final Design		List of drawing and specification references that convey conformance to applicable requirements.		MEC	
EQ3.1		Construction IAQ Management Plan: During Construction	**Preconstruction		Construction IAQ Management Plan		PE	
			Closeout		Statement confirming whether air handling units were operated during construction		PE	
			Closeout		Dated jobsite photos showing examples of IAQ management plan practices being implemented. Label photos to indicate which practice they demonstrate. Minimum one photo of each practice at each building.		PE	

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			Closeout	Spreadsheet indicating, for each filter installed during construction, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy.		PE
EQ3.2		Construction IAQ Management Plan: Before Occupancy	**Preconstruction	Construction IAQ Management Plan		PE
			Closeout	Statement indicating which option for compliance applies and confirming that required activities have occurred that meet the applicable requirements.		PE
			Closeout	Option 1a: Narrative describing the project's flushout process, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout	Option 1b: Narrative describing the project's pre-occupancy and post-occupancy flushout processes, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout	Option 2: Narrative describing the project's IAQ testing process, including specifics about contaminants tested for, locations, remaining work at time of test, retest parameters and special considerations (if any).		PE
			Closeout	Option 2: IAQ testing report demonstrating compliance.		PE
EQ4.1		Low Emitting Materials: Adhesives & Sealants	Closeout	Spreadsheet indicating, for each applicable indoor adhesive, sealant and sealant primer used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout	Spreadsheet indicating, for each applicable indoor aerosol adhesive, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor aerosol adhesives were used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material VOCs in spreadsheet		PE
EQ4.2		Low Emitting Materials: Paints & Coatings	Closeout	Spreadsheet indicating, for each applicable indoor paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout	Spreadsheet indicating, for each applicable indoor anti-corrosive/anti-rust paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor anti-corrosive/anti-rust paints were used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material VOCs in spreadsheet		PE
EQ4.3		Low Emitting Materials: Flooring Systems	Closeout	Spreadsheet indicating, for each indoor flooring system used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data.		PE
			Closeout	Spreadsheet indicating, for each indoor carpet cushion used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data - OR - Statement confirming no indoor carpet cushion was used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material compliance label in spreadsheet		PE
EQ4.4		Low Emitting Materials: Composite Wood & Agrifiber Products	Closeout	Spreadsheet indicating, for each indoor composite wood and agrifiber product used, the manufacturer, product name/model number, if it contains added urea formaldehyde (yes/no) and source of LEED compliance data.		PE
			Closeout	Manufacturer published product data or certification confirming material urea formaldehyde in spreadsheet		PE
EQ5		Indoor Chemical & Pollutant Source Control	Closeout	Spreadsheet indicating, for each permanent entryway system used, the manufacturer, product name/model number and description of system.		PE
			Final Design	List of drawing and specification references that convey locations and installation methods for entryway systems.		ARC
			Final Design	Spreadsheet indicating, for each chemical use area, the room number, room name, description of room separation features (walls, floor/ceilings, openings) and pressure differential from surrounding spaces with doors closed - OR - Statement confirming that project includes no chemical use areas and that no hazardous cleaning materials are needed for building maintenance.		ARC MEC
			Final Design	If project includes chemical use areas: List of drawing and specification references that convey locations of chemical use areas, room separation features and exhaust system.		ARC

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PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE REV
			Final Design	If project includes places where water and chemical concentrate mixing occurs: List of drawing and specification references that convey provisions for containment of hazardous liquid wastes OR - Statement confirming that project includes no places where water and chemical concentrate mixing occurs.	ARC MEC
			Closeout	If project includes chemical use areas: Spreadsheet indicating, for AHUs/mechanical ventilation equipment serving occupied areas, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy (yes/no) - OR - Statement confirming that project does not use mechanical equipment for ventilation of occupied areas.	PE
EQ6.1		Controllability of Systems: Lighting	Final Design	Calculation indicating total number of individual workstations, number of workstations with individual lighting controls and the percentage of workstations with individual lighting controls.	ELEC
			Final Design	For each shared multi-occupant space, provide a brief description of lighting controls.	ELEC
			Final Design	Narrative describing lighting control strategy, including type and location of individual controls and type and location of controls in shared multi-occupant spaces.	ELEC
EQ6.2		Controllability of Systems: Thermal Comfort	Final Design	Calculation indicating total number of individual workstations, number of workstations with individual thermal comfort controls and the percentage of workstations with individual thermal comfort controls.	MEC
			Final Design	For each shared multi-occupant space, provide a brief description of thermal comfort controls.	MEC
			Final Design	Narrative describing thermal comfort control strategy, including type and location of individual and shared multi-occupant controls.	MEC
EQ7.1		Thermal Comfort: Design	Final Design	Design criteria spreadsheet indicating, for spring, summer, fall and winter, maximum indoor space design temperature, minimum indoor space design temperature and maximum indoor space design humidity.	MEC
			Final Design	Narrative describing method used to establish thermal comfort control conditions and how systems design addresses the design criteria, including compliance with the referenced standard.	MEC
EQ7.2		Thermal Comfort: Verification	Final Design	Narrative describing the scope of work for the thermal comfort survey, including corrective action plan development	MEC
			Final Design	List of drawing and specification references that convey permanent monitoring system.	MEC
EQ8.1		Daylight & Views: Daylight 75% of Spaces	Final Design	Option 2: Table indicating all regularly occupied spaces with space area and space area with compliant daylight zone. Sum of regularly occupied areas and regularly occupied areas with compliant daylight zone. Percentage calculation of areas with compliant daylight zone to total regularly occupied areas.	ARC
			Final Design	Option 1: Simulation model method, software and output data	ELEC
			Final Design	Option 1: Table indicating all regularly occupied spaces with space area, space area with minimum 25 footcandles daylighting illumination, and method of providing glare control. Sum of regularly occupied areas and regularly occupied areas with 25 fc daylighting. Percentage calculation of areas with 25 fc daylighting to total regularly occupied areas.	ELEC
			Final Design	For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.	ARC
			Final Design	List of drawing and specification references that convey exterior glazed opening head and sill heights, glazing performance properties and glare control/sunlight redirection devices.	ARC
			Closeout	Manufacturer published product data or certification confirming glazing Tvis in spreadsheet	PE
EQ8.2		Daylight & Views: Views for 90% of Spaces	Final Design	Table indicating all regularly occupied spaces with space area and space area with access to views. Sum of regularly occupied areas and regularly occupied areas with access to views. Percentage calculation of areas with views to total regularly occupied areas.	ARC
			Final Design	For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.	ARC
			Final Design	LEED Floor plan drawings showing line of sight diagramming of views areas in each regularly occupied space. List of drawing/specification references that convey exterior glazed opening head and sill heights.	ARC

INNOVATION & DESIGN PROCESS

Thursday, May 27, 2010

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)		Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT		REQUIRED DOCUMENTATION	DATE	REV
IDc1.1		Innovation in Design	Final Design		Narrative describing intent, requirement for credit, project approach to the credit. List of drawings and specification references that convey implementation of credit. All other documentation that validates claimed credit.		
IDc1.2		Innovation in Design	Final Design				
IDc1.3		Innovation in Design	Final Design				
IDc1.4		Innovation in Design	Final Design				
IDc2		LEED Accredited Professional	Final Design		Narrative indicating name of LEED AP, company name of LEED AP, description of LEED AP's role and responsibilities in the project.		ARC

ATTACHMENT F
Version 02-03-2010

BUILDING INFORMATION MODELING REQUIREMENTS

1.0 Section 1 - Submittal Format

1.1. Design Deliverables. Develop all designs using Building Information Modeling (BIM) and Computer Aided Design (CAD) software. Design submittal drawings shall be Full Size size, suitable for half-size scaled reproduction.

2.0 Section 2 – Design Requirements

2.1. BIM Model and Facility Data. Contractor shall use BIM application(s) and software(s) to develop project designs. "Facility Data" is defined as associated intelligent attribute data. The "Model" is defined as 3D graphics that includes Facility Data and output as described in the paragraph 'Output' below. Contractors will use the Model to produce accurate Construction Documents. For each Center of Standardization (CoS) facility type included in this project, all BIM Models and associated Facility Data shall be submitted in Bentley Systems BIM XM Workspace 0924 with associated USACE Bentley BIM Workspace (which includes specific standard BIM libraries and definitions). This Workspace can be downloaded from the CAD/BIM Technology Center. [Where available, the workspace will be specific to this CoS Facility Standard Design. The Contractor will be provided a baseline multi-discipline BIM Project Model for the CoS Facility Standard Design type, where such a model exists (for the purposes of site adaptation).] The USACE Bentley BIM Workspace is dependent on specific versions of the Bentley BIM suite of products and only the versions of the software that are listed in the Contractor instructions included with the USACE BIM Workspace are permitted to be used.

2.1.1. Reference. Refer to ERDC TR-06-10, "U.S. Army Corps of Engineers Building Information Modeling Road Map" from the CAD/BIM Technology Center website for more information on the USACE BIM implementation goals.

2.2. Drawings. Deliver CAD files used for the creation of the Construction Documents Drawings per requirements in Section 01 33 16, the criteria of the USACE Fort Worth District, and as noted herein. Specification of a CAD file format for these Drawings does not limit which BIM application(s) or software(s) may be used for project development and execution.

2.2.1. IFC Support. The Contractor's selected BIM application(s) and software(s) must support the IFC (Industry Foundation Class - see www.iai-tech.org). Submit any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment for Government approval.

2.2.2. Submittal Requirements. BIM submittals shall be fully interoperable, compatible, and editable with the Bentley BIM tools. Use the specified version of the USACE Bentley BIM Workspace and conform to the requirements of **Sections 3 and 4 below**.

2.2.3. BIM Project Execution Plan.

2.2.3.1. Develop a BIM Project Execution Plan ("Plan" or "PxP") documenting the BIM and analysis technologies selected for the Project Model (integrated with the AEC CAD Standard) from concept development through As-Built as a design, production, coordination, construction, and documentation tool and the collaborative process by which it shall be executed. See Section 7 for additional guidance on developing the Plan.

2.2.4. BIM Requirements..

2.2.4.1. Facility Data. Develop the Facility Data consisting of a set of intelligent elements for the Model (e.g., doors, air handlers, electrical panels). This Facility Data shall include all material definitions and attributes that are necessary for the Project facility design and construction. Additional data in support of Section 6 Contractor Electives is encouraged.

2.2.4.2. Model Content. The Model and Facility Data shall include, at a minimum, the requirements of Section 4 below.

2.2.4.3. Model Granularity. Models may vary in level of detail for individual elements within a model, but at a minimum must include all features that would be included on a quarter inch (1/4" = 1'0") scaled drawing (e.g. at least 1/16th, 1/8th and 1/4th), or appropriately scaled civil drawings.

2.2.4.4. Output. Submitted CAD drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) and maintained from the submitted Model and Facility Data.

2.3. Quality Control. Implement quality control (QC) parameters for the Model, including:

2.3.1. Model Standards Checks. QC validation used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Report non-compliant elements and corrective action plan to correct non-compliant elements. Provide the government with detailed justification and request government approval for any non-compliant element which the contractor proposes to be allowed to remain in the Model.

2.3.2. CAD Standards Checks. QC checking performed to ensure that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per the A/E/C CADD Standard.

2.3.3. Other Parameters. Develop such other QC parameters as Contractor deems appropriate for the Project and provide to the Government for concurrence.

2.4. Design and Construction Reviews. Perform design and construction reviews at each submittal stage under Section 3 to test the Model, including:

2.4.1. Visual Checks. Checking to ensure the design intent has been followed and that there are no unintended elements in the Model.

2.4.2. Interference Management Checks. Locate conflicting spatial data in the Model where two elements are occupying the same space. Log hard interferences (e.g., mechanical vs. structural or mechanical vs. mechanical overlaps in the same location) and soft interferences, (e.g., conflicts regarding equipment clearance, service access, fireproofing, insulation) in a written report and resolve.

2.4.3. IFC Coordination View. Provide an IFC Coordination View in IFC Express format for all deliverables. Provide exported property set data for all IFC supported named building elements.

2.4.4. Other Parameters. Develop such other Review parameters as the Contractor deems appropriate for the Project and provide to the Government for concurrence..

3.0 Section 3 – Design Stage Submittal Requirements

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with BIM Project Execution Plan deliverables at stages as described hereinafter.

3.1.2. At each Stage in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.3 and 2.4 have been completed. This report shall be discussed as part of the review process and shall address cross-discipline interferences, if any.

3.1.3. At each Stage in Paragraphs 3.3 through 3.6, provide the Government with:

- The Model, Facility Data, Workspace and CAD Data files in native Bentley BIM/CAD.

- A 3-D interactive review format of the Model in Bentley Navigator, Autodesk Navisworks, Adobe 3D PDF 7.0 (or later), Google Earth KMZ or other format per Plan requirements. The file format for reviews can change between submittals.

- A list of all submitted files. The list should include a description, directory, and file name for each file submitted. For all CAD sheets, include the sheet title and sheet number. Identify files that have been produced from the submitted Model and Facility Data.

3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the Plan where, in addition to Paragraph 3.1.4, the USACE Geographic District BIM Manager will coordinate with the USACE CoS BIM Manager to confirm acceptability of the Plan or advise as to additional processes or activities necessary to be incorporated.

3.2.2. Within thirty (30) days after the approval of the Plan, conduct a demonstration to review the Plan for clarification, and to verify the functionality of Model technology workflow and processes. If modifications are required, the Contractor shall complete the modifications and resubmit the Plan and perform subsequent demonstration for Government acceptance. There will be no payment for design or construction until the Plan is acceptable to the Government. The Government may also withhold payment for design and construction for unacceptable performance in executing the approved Plan.

3.3. Interim Design Submittals.

3.3.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4 as applicable to the Interim Design package(s).

3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4. Acceptance according to Paragraph 3.1.4 is required before commencement of construction, as described in Paragraph 3.7.6 of Section 01 33 16.

3.5. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model, including interference management and design change tracking information.

3.6. Final As-Built BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built conditions for Government Approval, as specified in Section 01 78 02.00 10, PROJECT CLOSEOUT.

4.0 **Section 4 – BIM Model Minimum Requirements and Output**

4.1. General Provisions. The deliverable Model shall be developed to include the systems described below as they would be built and the processes of installing them, and to reflect final as-built conditions. The deliverable model at the interim design stage and at the final design stage (“released for construction”) shall be developed to include as many of the systems described below as are necessary and appropriate at that design stage.

4.2. Architectural/Interior Design. The Architectural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.2.1. Spaces. The Model shall include spaces defining accurate net square footage and net volume, and holding data for the room finish schedule for including room names and numbers. Include Programmatic Information provided by the Government or validated program to verify design space against programmed space, using this information to validate area quantities.

4.2.2. Walls and Curtain Walls. Each wall shall be depicted to the exact height, length, width and ratings (thermal, acoustic, fire) to properly reflect wall types. The Model shall include all walls, both interior and exterior, and the necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.2.3. Doors, Windows and Louvers. Doors, windows and louvers shall be depicted to represent their actual size, type and location. Doors and windows shall be modeled with the necessary intelligence to produce accurate window and door schedules.

4.2.4. Roof. The Model shall include the roof configuration, drainage system, penetrations, specialties, and the necessary intelligence to produce accurate plans, building sections and generic wall sections where roof design elements are depicted.

4.2.5. Floors. The floor slab shall be developed in the structural Model and then referenced by the architectural Model for each floor of the Project building.

4.2.6. Ceilings. All heights and other dimensions of ceilings, including soffits, ceiling materials, or other special conditions shall be depicted in the Model with the necessary intelligence to produce accurate plans, building sections and generic wall sections where ceiling design elements are depicted.

4.2.7. Vertical Circulation. All continuous vertical components (i.e., non-structural shafts, architectural stairs, handrails and guardrails) shall be accurately depicted and shall include the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.

4.2.8. Architectural Specialties and Woodwork. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and woodwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.

4.2.9. Signage. The Model shall include all signage and the necessary intelligence to produce accurate plans and schedules.

4.2.10. Schedules. Provide door, window, hardware sets using BHMA designations, flooring, wall finish, and signage schedules from the Model, indicating the type, materials and finishes used in the design.

4.3. Furniture. The furniture systems Model may vary in level of detail for individual elements within a Model, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing, and have necessary intelligence to produce accurate plans. Representation of furniture elements is to be 2D. Contractor may provide a minimal number of 3D representations as examples. Examples of furniture include, but are not limited to, desks, furniture systems, seating, tables, and office storage.

4.3.1. Furniture Coordination. Furniture that makes use of electrical, data or other features shall include the necessary intelligence to produce coordinated documents and data.

4.4. Equipment. The Model may vary in level of detail for individual elements within a Model. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and minimum schedules depicting their configuration. Examples of equipment include but are not limited to copiers, printers, refrigerators, ice machines and microwaves.

4.4.1. Schedules. Provide furniture and equipment schedules from the model indicating the materials, finishes, mechanical, and electrical requirements.

4.5. Structural. The structural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:

4.5.1. Foundations. All necessary foundation and/or footing elements, with necessary intelligence to produce accurate plans and elevations

4.5.2. Floor Slabs. Structural floor slabs shall be depicted, including all necessary recesses, curbs, pads, closure pours, and major penetrations accurately depicted.

4.5.3. Structural Steel. All steel columns, primary and secondary framing members, and steel bracing for the roof and floor systems (including decks), including all necessary intelligence to produce accurate structural steel framing plans and related building/wall sections.

4.5.4. Cast-in-Place Concrete. All walls, columns, and beams, including necessary intelligence to produce accurate plans and building/wall sections depicting cast-in-place concrete elements.

4.5.5. Expansion/Contraction Joints. Joints shall be accurately depicted.

4.5.6. Stairs. The structural Model shall include all necessary openings and framing members for stair systems, including necessary intelligence to produce accurate plans and building/wall sections depicting stair design elements.

4.5.7. Shafts and Pits. The structural Model shall include all necessary shafts, pits, and openings, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.

4.6. Mechanical. The mechanical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2" NPS) field-routed piping is not required in the model. Additional minimum Model requirements include:

4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution ducts for supply, return, and ventilation and exhaust ducts, including control system, registers, diffusers, grills and hydronic baseboards with necessary intelligence to produce accurate plans, elevations, building/wall sections and schedules.

4.6.1.1. Mechanical Piping. All necessary piping and fixture layouts, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, and schedules.

4.6.2. Plumbing. All necessary plumbing piping and fixture layouts, floor and area drains, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules.

4.6.3. Equipment Clearances. All HVAC and Plumbing equipment clearances shall be modeled for use in interference management and maintenance access requirements.

4.6.4. Elevator Equipment. The Model shall include the necessary equipment and control system, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.7. Electrical/Telecommunications. The electrical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2"Ø) field-routed conduit is not required in the model. Additional minimum Model requirements include:

4.7.1. Interior Electrical Power and Lighting. All necessary interior electrical components (i.e., lighting, receptacles, special and general purpose power receptacles, lighting fixtures, panelboards, cable trays and control systems), including necessary intelligence to produce accurate plans, details and schedules. Lighting and power built into furniture/equipment shall be modeled.

4.7.2. Special Electrical Systems. All necessary special electrical components (i.e., security, Mass Notification, Public Address, nurse call and other special occupancies, and control systems), including necessary intelligence to produce accurate plans, details and schedules.

4.7.3. Grounding Systems. Grounding Systems. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, bonding), including necessary intelligence to produce accurate plans, details and schedules.

4.7.4. Communications. All existing and new communications service controls and connections, both above ground and underground with necessary intelligence to produce accurate plans, details and schedules. Cable tray routing shall be modeled without detail of cable contents.

4.7.5. Exterior Building Lighting. All necessary exterior lighting with necessary intelligence to produce accurate plans, elevations and schedules. The exterior building lighting Model shall include all necessary lighting, relevant existing and proposed support utility lines and equipment required with necessary intelligence to produce accurate plans, details and schedules.

4.7.6. Equipment Clearances. The model shall incorporate and define all electrical and communications working spaces, clearances, and required access

4.8. Fire Protection. The fire protection system Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:

4.8.1. Fire Protection System. All relevant fire protection components (i.e., branch piping, sprinkler heads, fittings, drains, pumps, tanks, sensors, control panels) with necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules. All fire protection piping shall be modeled.

4.8.2. Fire Alarms. Fire alarm/mass notification devices and detection system shall be indicated with necessary intelligence to produce accurate plans depicting them.

4.9. Civil. The civil Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a one inch (1"=100') scaled drawing. Additional minimum Model requirements include:

4.9.1. Terrain (DTM). All relevant site conditions and proposed grading, including necessary intelligence to produce accurate Project site topographical plans and cross sections.

4.9.2. Drainage. All existing and new drainage piping, including upgrades thereto, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.3. Storm Water and Sanitary Sewers. All existing and new sewer structures and piping, including upgrades thereto, on the Project site with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.4. Utilities. All necessary new utilities connections from the Project building(s) to the existing or newly-created utilities, and all existing above ground and underground utility conduits, including necessary intelligence to produce accurate plans and site-sections.

4.9.5. Roads and Parking. All necessary roadways and parking lots or parking structures, including necessary intelligence to produce accurate plans, profiles and cross-sections.

5.0 Section 5 - Ownership and Rights in Data

5.1. Ownership. The Government has ownership of and rights at the date of Closeout Submittal to all CAD files, BIM Model, and Facility Data developed for the Project in accordance with FAR Part 27, clauses incorporated in Section 00 72 00, Contract Clauses and Special Contract Requirement 1.14 GOVERNMENT RE-USE OF DESIGN (Section 00 73 00). The Government may make use of this data following any deliverable.

6.0 Section 6 – Contractor Electives

6.1. Applicable Criteria. If the Contractor elected to include one or more of the following features as an elective in its accepted contract proposal for additional credit during the source selection, as described in the proposal submission requirements and evaluation criteria, the following criteria are requirements, as applicable to those elective feature(s).

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements as defined by the Whole Building Design Guide organization, including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate file formats that would otherwise be printed and submitted in compliance with Project operations and maintenance handover requirements.

6.3. Project Scheduling using the Model. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of the project construction schedule.

6.3.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver the construction schedule with information derived from the Model.

6.3.1.1. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model for project scheduling.

6.4. Cost Estimating. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of cost estimating requirements, or other applications such as cost analysis and estimate validation.

6.4.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project completion. At project completion, the Contractor shall provide an MII (Micro Computer Aided Cost Estimating System Generation II) Cost Estimate which follows the USACE Cost Engineering Military Work Breakdown System (WBS), a modified Uniformat, to at least the sub-systems level and uses quantity information supplied directly from BIM output to the maximum extent possible, though other "Gap" quantity information will be included as necessary for a complete and accurate cost estimate.

6.4.2.1. Sub system level extracted quantities from the BIM for use within the estimate shall be provided according to how detailed line items or tasks should be installed/built so that accurate costs can be developed and/or reflected. Therefore, when developing a BIM, the designer shall be cognizant of what tasks need to be separated appropriately at the beginning stages of model development, such as tasks done on the first floor versus the same task on higher floors that will be more labor intensive and therefore need to have a separate quantity and be priced differently. Tasks and their extracted quantities from the BIM shall be broken down by their location (proximity in the structure) as well as the complexity of its installation.

6.4.2.2. At all design stages it shall be understood that BIM output as described in this document will not generate all quantities that are necessary in order to develop a complete and accurate cost estimate of the project based on the design. An example of this would be plumbing that is less than 1.5" diameter and therefore not expected to be modeled due to granularity; this information is commonly referred to as The Gap. Quantities from The Gap and their associated costs shall be included in the final project actual cost estimates as well.

6.5. Other Analyses and Reports. Structural, energy and efficiency, EPACT 2005 & EISA 2007, lighting design, daylighting, electrical power, psychrometric processing, shading, programming, LEED, fire protection, code compliance, Life Cycle Cost, acoustic, plumbing.

7.0 Section 7 – BIM Project Execution Plan Template

7.1. Contractors will utilize the latest version of the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template to develop an acceptable Plan. The template can be downloaded from the CAD/BIM Technology Center website.

ATTACHMENT G**DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT**

Organize electronic design submittal files in a subdirectory/file structure in accordance with the following table. The Contractor may suggest a slightly different structure, subject to the discretion of the government.

Design Submittal Directory and Subdirectory File Arrangement.

Directory	Sub-Directory	Sub-Directory or Files	Files
Submittal/Package Name	Narratives	PDF file or files with updated design narrative for each applicable design discipline	
	Drawings	PDF (subdirectory)	Single PDF file with all applicable drawing sheets - bookmarked by sheet number and name
		BIM (subdirectory) See Attachment F.	BIM project folder (with files) per the USACE Workspace. Include an Excel drawing index file with each drawing sheet listed by sheet #, name and corresponding dgn file name (Final Design & Design Complete only)
	Design Analysis & Calculations	Individual PDF files containing design analysis and calculations for each discipline applicable to the submittal	
		PDF file with Fire Protection and Life Safety Code Review checklist	
	LEED	PDF file with updated Leed Check List	
		PDF file or files with LEED Templates for each point with applicable documentation included in each file.	
		LEED SUBMITTALS	
	Energy Analysis	PDF with baseline energy consumption analysis	
		PDF with actual building energy consumption analysis	
	Specifications	Single PDF file with table of contents and all applicable specifications sections.	
		Submittal Register (Final Design & Design Complete submittal only)	
	Design Quality Control	PDF file or files with DQC checklist(s) and/or statements	
	Building Rendering(s)	PDF file of rendering for each building type included in contract (Final Design & Design Complete).	

SECTION 01 45 04.00 10
CONTRACTOR QUALITY CONTROL

1.0 GENERAL

1.1. REFERENCES

1.2. PAYMENT

2.0 PRODUCTS (NOT APPLICABLE)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

3.2. QUALITY CONTROL PLAN

3.3. COORDINATION MEETING

3.4. QUALITY CONTROL ORGANIZATION

3.5. SUBMITTALS AND DELIVERABLES

3.6. CONTROL

3.7. TESTS

3.8. COMPLETION INSPECTION

3.9. DOCUMENTATION

3.10. NOTIFICATION OF NONCOMPLIANCE

1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Refer to the latest edition, as of the date of the contract solicitation.

- ASTM INTERNATIONAL (ASTM)
- ASTM D 3740 Minimum Requirements for Agencies
Engaged in the Testing and/or Inspection
of Soil and Rock as Used in Engineering
Design and Construction
- ASTM E 329 Agencies Engaged in the Testing
and/or Inspection of Materials Used in
Construction
- U.S. ARMY CORPS OF ENGINEERS (USACE)
ER 1110-1-12 Quality Management

1.2. PAYMENT

There will be no separate payment for providing and maintaining an effective Quality Control program. Include all costs associated therewith in the applicable unit prices or lump-sum prices contained in the Contract Line Item Schedule.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product, which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. The site project superintendent is responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2. QUALITY CONTROL PLAN

Furnish for Government review, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Design and construction may begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. The Government will not permit work outside of the features of work included in an accepted interim plan to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started. Where the applicable Code issued by the International Code Council calls for an inspection by the Building Official, the Contractor shall include the inspections in the Quality Control Plan and shall perform the inspections. The Designer of Record shall develop a program for any special inspections required by the applicable International Codes and the Contractor shall perform these inspections, using qualified inspectors. Include the special inspection plan in the QC Plan.

3.2.1. Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), fabricators, suppliers, and purchasing agents:

3.2.1.1. A description of the quality control organization. Include a chart showing lines of authority and an acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. A CQC System Manager shall report to the project superintendent or someone higher in the contractor's organization.

3.2.1.2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Also include those responsible for performing and documenting the inspections required by the International Codes and the special inspection program developed by the designer of record.

3.2.1.3. A copy of the letter to the CQC System Manager, signed by an authorized official of the firm, which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Furnish copies of these letters.

3.2.1.4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3.2.1.5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Use only Government approved Laboratory facilities.

3.2.1.6. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

3.2.1.7. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

3.2.1.8. Reporting procedures, including proposed reporting formats.

3.2.1.9. A list of the definable features of work. A definable feature of work is a task, which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.1.10. A list of all inspections required by the International Codes and the special inspection program required by the code and this contract.

3.2.2. Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the Design Quality Control (DQC) plan:

3.2.2.1. The Contractor's QCP Plan shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, competent, independent reviewers identified in the DQC Plan shall review all documents. Use personnel who were not involved in the design effort to produce the design to perform the independent technical review (ITR). The ITR is intended as a quality control check of the design. Include, at least, but not necessarily limited to, a review of the contract requirements (the accepted contract or task order proposal and amended RFP), the basis of design, design calculations, the design configuration management documentation and check the design documents for

errors, omissions, and for coordination and design integration. The ITR team is not required to examine, compare or comment concerning alternate design solutions but should concentrate on ensuring that the design meets the contract requirements. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

3.2.2.2. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists at each design phase as part of the project documentation.

3.2.2.3. A Design Quality Control Manager, who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated, shall implement the DQC Plan. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. Notify the Government, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

3.2.3. Acceptance of Plan

Government acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4. Notification of Changes

After acceptance of the CQC Plan, notify the Government in writing of any proposed change. Proposed changes are subject to Government acceptance.

3.3. COORDINATION MEETING

After the Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor and the Government shall meet and discuss the Contractor's quality control system. Submit the CQC Plan for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. The Government will prepare minutes of the meeting for signature by both parties. . The minutes shall become a part of the contract file. There may be occasions when either party will call for subsequent conferences to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4. QUALITY CONTROL ORGANIZATION

3.4.1. Personnel Requirements

The requirements for the CQC organization are a CQC System Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure contract compliance. The CQC organization shall also include personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly furnish complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System

Manager shall be a graduate engineer, graduate architect, or a BA/BS graduate of an ACCE accredited construction management college program. The CQC system Manager may alternately be an engineering technician with at least 2 years of college and an ICC certification as a Commercial Building Inspector (Residential Building Inspector certification will be required for Military Family Housing projects). In addition, the CQC system manager shall have a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. Assign the CQC System Manager no other duties (except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00). Identify an alternate for the CQC System Manager in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager but the alternate may have other duties in addition to serving in a temporary capacity as the acting QC manager.

3.4.3. CQC Personnel

3.4.3.1. In addition to CQC personnel specified elsewhere in the contract provide specialized CQC personnel to assist the CQC System Manager in accordance with paragraph titled Area Qualifications.

3.4.3.2. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; **are not intended to be full time, but must be physically present at the construction site during work on their areas of responsibility**; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. **One person may cover more than one area, provided that they are qualified to perform QC activities for the designated areas below and provided that they have adequate time to perform their duties:**

3.4.4. Experience Matrix

3.4.4.1. Area Qualifications

3.4.4.1.1. Civil - Graduate Civil Engineer or (BA/BS) graduate in construction management with 4 years experience in the type of work being performed on this project or engineering technician with 5 yrs related experience.

3.4.4.1.2. Mechanical - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Mechanical Inspector with 5 yrs related experience.

3.4.4.1.3. Electrical - Graduate Electrical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Electrical Inspector with 5 yrs related experience.

3.4.4.1.4. Structural - Graduate Structural Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or person with an ICC certification as a Reinforced Concrete Special Inspector and Structural Steel and Bolting Special Inspector (as applicable to the type of construction involved) with 5 yrs related experience.

3.4.4.1.5. Plumbing - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience, or person with an ICC certification as a Commercial Plumbing Inspector with 5 yrs related experience.

3.4.4.1.6. Concrete, Pavements and Soils Materials Technician (present while performing tests) with 2 yrs experience for the appropriate area

3.4.4.1.7. Testing, Adjusting and Balancing Specialist must be a member (TAB) Personnel of AABC or an experienced technician of the firm certified by the NEBB (present while testing, adjusting, balancing).

3.4.4.1.8. Design Quality Control Manager Registered Architect or Professional Engineer (not required on the construction site)

3.4.4.1.9. Registered Fire Protection Engineer with 4 years related experience or engineering technician with 5 yrs related experience (but see requirements for Fire Protection Engineer of Record to witness final testing in Section 01 10 00, paragraph 5.10, Fire Protection).

3.4.4.1.10. QC personnel assigned to the installation of the telecommunication system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification. In lieu of BICSI certification, QC personnel shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. QC personnel shall witness and certify the testing of telecommunications cabling and equipment.

3.4.5. Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered at Charleston District. Inquire of the District or Division sponsoring the course for fees and other expenses involved, if any, for attendance at this course.

3.4.6. Organizational Changes

When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5. SUBMITTALS AND DELIVERABLES

Make submittals as specified in Section 01 33 00 **SUBMITTAL PROCEDURES**. The CQC organization shall certify that all submittals and deliverables are in compliance with the contract requirements.

3.6. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The CQC organization shall conduct at least three phases of control for each definable feature of the construction work as follows:

3.6.1. Preparatory Phase

Perform this phase prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

3.6.1.1. A review of each paragraph of applicable specifications, reference codes, and standards. Make a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field at the preparatory inspection. Maintain these copies in the field, available for use by Government personnel until final acceptance of the work.

3.6.1.2. A review of the contract drawings.

3.6.1.3. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

3.6.1.4. Review of provisions that have been made to provide required control inspection and testing.

3.6.1.5. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

3.6.1.6. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

3.6.1.7. A review of the appropriate activity hazard analysis to assure safety requirements are met.

3.6.1.8. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

3.6.1.9. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

3.6.1.10. Discussion of the initial control phase.

3.6.1.11. Notify the Government at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2. Initial Phase

Accomplish this phase at the beginning of a definable feature of work. Include the following actions:

3.6.2.1. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

3.6.2.2. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

3.6.2.3. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

3.6.2.4. Resolve all differences.

3.6.2.5. Check safety to include compliance with and upgrading of the Accident Prevention plan and activity hazard analysis. Review the activity analysis with each worker.

3.6.2.6. Notify the Government at least 24 hours in advance of beginning the initial phase. The CQC System Manager shall prepare and attach to the daily CQC report separate minutes of this phase. Indicate exact location of initial phase for future reference and comparison with follow-up phases.

3.6.2.7. Repeat the initial phase any time acceptable specified quality standards are not being met.

3.6.3. Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

3.6.4. Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7. TESTS

3.7.1. Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements and project design documents. Upon request, furnish to the Government

duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory, or establish an approved testing laboratory at the project site. The Contractor may elect to use a laboratory certified and accredited by the Concrete and cement Reference Laboratory (CCRL) or by AASHTO Materials Reference Laboratory (AMRL) for testing procedures that those organizations certify. The Contractor shall perform the following activities and record and provide the following data:

3.7.1.1. Verify that testing procedures comply with contract requirements and project design documents.

3.7.1.2. Verify that facilities and testing equipment are available and comply with testing standards.

3.7.1.3. Check test instrument calibration data against certified standards.

3.7.1.4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

3.7.1.5. Include results of all tests taken, both passing and failing tests, recorded on the CQC report for the date taken. Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2. Testing Laboratories

3.7.2.1. Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2. Capability Recheck

If the selected laboratory fails the capability check, the Government will assess the Contractor a charge of \$1,375 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3. Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4. Furnishing or Transportation of Samples for Government Quality Assurance Testing

The Contractor is responsible for costs incidental to the transportation of samples or materials. Deliver samples of materials for test verification and acceptance testing by the Government to the Corps of Engineers Laboratory, f.o.b., at the following address:

- For delivery by mail:
 - To Be Furnished at Pre-construction Meeting
 - TBD
 - TBD
 - TBD
- For other deliveries:
 - To Be Furnished at Pre-construction Meeting

TBD

TBD

TBD

The area or resident office will coordinate, exact delivery location, and dates for each specific test.

3.8. COMPLETION INSPECTION

3.8.1. Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. Prepare a punch list of items which do not conform to the approved drawings and specifications and include in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2. Pre-Final Inspection

As soon as practicable after the notification above, the Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. Accomplish these inspections and any deficiency corrections required by this paragraph within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3. Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall attend the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups and major commands may also attend. The Government will formally schedule the final acceptance inspection based upon results of the Pre-Final inspection. Provide notice to the Government at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9. DOCUMENTATION

3.9.1. Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers using government-provided software, QCS (see Section 01 45 01.10). The report includes, as a minimum, the following information:

3.9.1.1. Contractor/subcontractor and their area of responsibility.

3.9.1.2. Operating plant/equipment with hours worked, idle, or down for repair.

3.9.1.3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

- 3.9.1.4. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the applicable control phase (Preparatory, Initial, Follow-up). List deficiencies noted, along with corrective action.
- 3.9.1.5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- 3.9.1.6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- 3.9.1.7. Offsite surveillance activities, including actions taken.
- 3.9.1.8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- 3.9.1.9. Instructions given/received and conflicts in plans and/or specifications.
- 3.9.1.10. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identity of the ITR team, the ITR review comments, responses and the record of resolution of the comments.
- 3.9.2. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, submit one report for every 7 days of no work and on the last day of a no work period. Account for all calendar days throughout the life of the contract. The first report following a day of no work shall be for that day only. The CQC System Manager shall sign and date reports. The report shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. The Contractor may submit these forms electronically, in lieu of hard copy.

3.10. NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

End of Section 01 45 04.00 10

SECTION 01 50 02.0005
TEMPORARY CONSTRUCTION FACILITIES

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.6. GOVERNMENT FIELD OFFICE

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 50 02 apply to this task order, except as otherwise specified herein.

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1. Bulletin Board (As Specified in Base contract)

1.3.2. Project and Safety Signs (Added to Stress standardization of signs, in the event that the Base ID/IQ Section 01 50 02 does not contain this information)

Erect a project sign and a site safety sign with informational details as provided by the Government at the Post award conference, within 15 days prior to any work activity on project site. Update the safety sign data daily, with light colored metallic or non-metallic numerals. Remove the signs from the site upon completion of the project. Engineer Pamphlet EP 310-1-6a contains the standardized layout and construction details for the signs. It can be found through a GOOGLE Search or try <http://www.usace.army.mil/publications/eng-pamphlets/ep310-1-6a/s-16.pdf>.

1.6. GOVERNMENT FIELD OFFICE

1.6.1. Resident Engineer's Office

Provide the Government Resident Engineer with an office, approximately 1,440 square feet in floor area, co-located on the project site with the Contractor's office and providing space heat, air conditioning, electric light and power, power and communications outlets and toilet facilities consisting of at least one lavatory and at least one water closet complete with connections to water and sewer mains. Provide a mail slot in the door or a lockable mail box mounted on the surface of the door. Provide outlets for 10 government phones and same number of LAN connections for Government computers. Coordinate with the Resident Engineer for locations. Provide a conference room with space large enough for 12 personnel to hold meetings. Provide a minimum of two outlets per government work station and at least one outlet per 10 feet of wall space for other government equipment. Provide at least twice weekly janitorial service. Remove the office facilities upon completion of the work and restore those areas. Connect and disconnect utilities in accordance with local codes and to the satisfaction of the Contracting Officer.

1.6.2. Trailer-Type Mobile Office

The Contractor may, at its option, furnish and maintain a trailer-type mobile office acceptable to the Contracting Officer and providing as a minimum the facilities specified above. Securely anchor the trailer to the ground at all four corners to guard against movement during high winds, per EM 385-1-1.

End of Section 01 50 02.0005

SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 4439	(2004) Geosynthetics
ASTM D 4491	(1999a; R 2004e1) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2004) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(2002) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 832-R-92-005	(1992) Storm Water Management for Construction Activities Developing Pollution Preventions and Plans and Best Management Practices
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
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1.2 SYSTEM DESCRIPTION

The work consists of implementing the storm water pollution prevention measures to prevent sediment from entering streams or water bodies as specified in this Section in conformance with the requirements of SECTION 01 57 24 STORM WATER POLLUTION PREVENTION PLAN, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit or applicable state Pollution Discharge Elimination System.

1.3 EROSION AND SEDIMENT CONTROLS

1.3.1 Stabilization Practices

The stabilization practices to be implemented include temporary seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, erosion control matts, protection of trees, preservation of mature vegetation, etc. On the daily CQC Report, record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated.

1.3.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity [temporarily or] permanently ceases or is precluded by unsuitable conditions caused by the weather, initiate stabilization practices as soon as practicable after conditions become suitable.

1.3.1.2 Burnoff

Burnoff of the ground cover is not permitted.

1.3.1.3 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified, and protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

1.3.2 Erosion, Sediment and Stormwater Control

a. Not Used

b. Not Used

c. Not Used

d. Storm Water Notice of Intent for Construction Activities

e. Submit a Storm Water Notice of Intent for NPDES coverage under the general permit for construction activities and a Storm Water Pollution Prevention Plan (SWPPP) for the project to the Contracting Officer prior to the commencement of work. The SWPPP shall meet the requirements of the EPA general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate Federal and State agency for approval, while meeting the required waiting periods for document submission and land disturbance commencement. Maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, to reflect current site conditions. Include within the SWPPP:

(1) Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.

Fort Jackson Basic Training Barracks (3) and Site

FJBTC3

(2) Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.

(3) Ensure compliance with terms of the EPA general permit for storm water discharge.

(4) Select applicable best management practices from EPA 832-R-92-005.

(5) Include a completed copy of the Registration Statement, BMP Inspection Report Template and Notice of Termination except for the effective date.

(6) Storm Water Pollution Prevention Measures and Notice of Intent 40 CFR 122.26, EPA 832-R-92-005. Provide a "Storm Water Pollution Prevention Plan" (SWPPP) for the project. The SWPPP will meet the requirements of the EPA or State of South Carolina, whichever is applicable,

(9) Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare and submit to DCR, BMP Inspection Reports as required by the general permit.

(10) Once construction is complete and the site has been stabilized with a final, sustainable cover, submit the Notice of Termination to DCR within 30 days after all land disturbing activities end.

(13) Once construction is complete and the site has been stabilized with a final, sustainable cover, submit the Notice of Termination to DCR within 30 days after all land disturbing activities end.

1.3.3 Structural Practices

Implement structural practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement structural practices in a timely manner, during the construction process, to minimize erosion and sediment runoff. Include the following devices;

1.3.3.1 Silt Fences

Provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Properly install silt fences to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Install silt fences in the locations and show on the SWPPP drawings. Final removal of silt fence barriers shall be after establishment of final stabilization. Obtain approval from the Contracting Officer prior to final removal of silt fence barriers.

1.3.4 Sediment Basins

Trap sediment in temporary sediment basins. Select a basin size to accommodate the runoff of a local -year storm. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical

Fort Jackson Basic Training Barracks (3) and Site

FJBTC3

overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs. Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare BMP Inspection Reports as required by the general permit. If required by the permit, include those inspection reports.

1.3.5 Vegetation and Mulch

a. Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

b. Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish a suitable stand of grass.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Storm Water Pollution Prevention Plan
Storm Water Notice of Intent

SD-06 Test Reports

Storm Water Inspection Reports for General Permit
Erosion and Sediment Controls

SD-07 Certificates

Mill Certificate or Affidavit

Certificate attesting that the Contractor has met all specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

Identify, store and handle filter fabric in accordance with ASTM D 4873.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

Provide geotextile that complies with the requirements of ASTM D 4439, and consists of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight

Fort Jackson Basic Training Barracks (3) and Site

FJBTC3

of ester, propylene, or amide, and contains stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. Provide synthetic filter fabric that contains ultraviolet ray inhibitors and stabilizers to assure a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile	ASTM D 4632	100 lbs. min.
Elongation (percent)		30 percent max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Stakes and Posts

Use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 by 2 inches when oak is used and 4 by 4 inches when pine is used, and have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 5 feet.

2.1.3 Mill Certificate or Affidavit

Provide a mill certificate or affidavit attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. Specify in the mill certificate or affidavit the actual Minimum Average Roll Values and identify the fabric supplied by roll identification numbers. Submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. Provide bales with a standard cross section of 14 by 18 inches. Wire-bound or string-tie all bales. Use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 by 2 inches in cross section and have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 3 feet.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Extend silt fences a minimum of 16 inches above the ground surface without exceeding 34 inches above the ground surface. Provide filter fabric from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, splice together filter fabric at a

support post, with a minimum 6 inch overlap, and securely sealed. Excavate trench approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4 by 4 inch trench shall be backfilled and the soil compacted over the filter fabric. Remove silt fences upon approval by the Contracting Officer.

3.2 INSTALLATION OF STRAW BALES

Place the straw bales in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Install straw bales so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. Entrench and backfill the barrier. Excavate a trench the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), backfill the excavated soil against the barrier. Conform the backfill soil with the ground level on the downhill side and build up to 4 inches against the uphill side of the barrier. Scatter loose straw over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Securely anchor each bale by at least two stakes driven through the bale. Drive the first stake or steel post in each bale toward the previously laid bale to force the bales together. Drive stakes or steel pickets a minimum 18 inches deep into the ground to securely anchor the bales.

3.3 FIELD QUALITY CONTROL

Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

3.3.1 Silt Fence Maintenance

Inspect the silt fences in accordance with paragraph, titled "Inspections," of this section. Any required repairs shall be made promptly. Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, replace the fabric promptly. Remove sediment deposits when deposits reach one-third of the height of the barrier. Remove a silt fence when it is no longer required. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall receive erosion control .

3.4 INSPECTIONS

3.4.1 General

Inspect disturbed areas of the construction site, areas that have not been finally stabilized used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles exit the site.

3.4.2 Inspections Details

Inspect disturbed areas and areas used for material storage that are

exposed to precipitation for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures to ensure that they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

3.4.3 Inspection Reports

For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, and all other requirements specified in the applicable Construction Storm Water General Permit. Furnish the report to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

3.4.4 Storm Water Pollution Prevention Plan (SWPPP) Revisions

In compliance with SECTION 01 57 24 STORM WATER POLLUTION PREVENTION PLAN, the Contractor is responsible to revise Storm Water Pollution Prevention Plan including the erosion control drawings. The current locations of storm control structures and types shall be depicted on the drawing portion of the on-site SWPPP for regulatory inspection and SWPPP revision record.

-- End of Section --

APPENDIX A
Geotechnical Information

Not Used

Appendix B**List of Drawings**

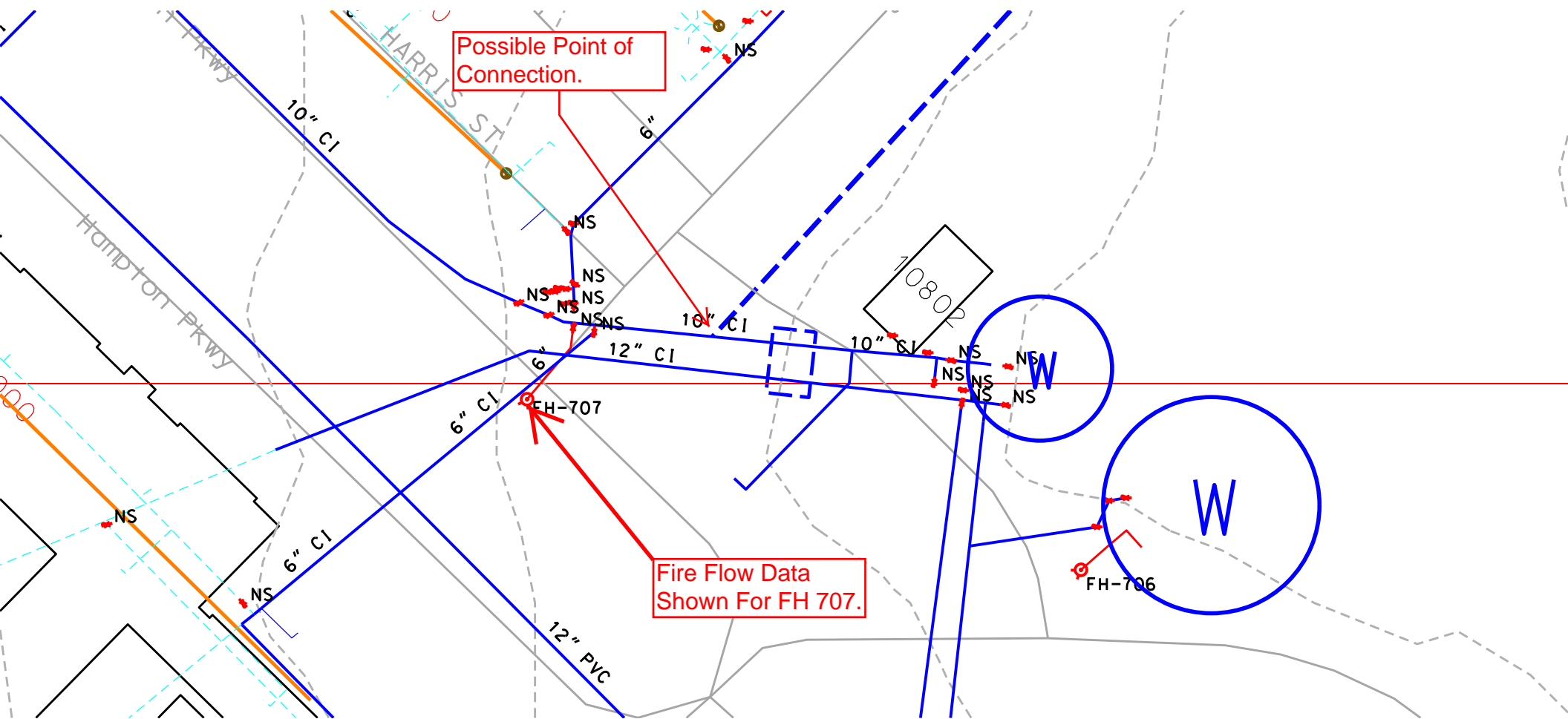
The following drawings can be found in Appendix J.

DRAWING LIST				
SHEET NUMBER	PLATE NUMBER	SHEET TITLE	FILE NAME	CAL FILE
1	G-001	COVER SHEET AND INDEX OF DRAWINGS	JMKG-001.dgn	01.cal
2	GC101	HAUL ROUTE PLAN	JMKGC101.dgn	02.cal
3	CD101	SITE DEMOLITION PLAN	JMKCD101.dgn	03.cal
4	CS101	OVERALL SITE LAYOUT PLAN	JMKCS101.dgn	04.cal
5	CG101	OVERALL GRADING PLAN	JMKCG101.dgn	05.cal
6	CU101	UTILITY PLAN 1 OF 2	JMKCU101.dgn	06.cal
7	CU102	UTILITY PLAN 2 OF 2	JMKCU102.dgn	07.cal
8	CU401	OVERALL UTILITY PLAN	JMKCU401.dgn	08.cal

Utility information is shown on the Utility Drawings in Appendix J.

APPENDIX D

Section:





Hydrant Flow Test Report

Location Elevated Water TANK Date 4-9-2010

Test made by Scott Jackson Time 9:00

Representative of Palmetto State Utility Service Hydrant #: 706

Witness Roy Cuthbertson

State purpose of test Design flow test for BTC III

Consumption rate during test _____

If pumps affect test, indicate pumps operating _____



Flow hydrants: 706 (Elevated Tank)

Size nozzle 2.5

Pilot reading _____

Discharge coefficient (Total gpm): _____

gpm 1050

Static B 43 psi Residual B 41 psi

Projected results @ 20 psi Residual _____ gpm: or @ _____ psi Residual _____ gpm

Remarks Hydrant Static "B" point located on Jenkins Rd is indicated by water atlas to be at the end of water line.

Location map: Show line sizes and distance to next cross-connected line. Show valves and hydrant branch size. Indicate north. Show flowing hydrants - Label A₁, A₂, A₃, A₄. Show location of static and residual - Label B.

Indicate B Hydrant ☒ Sprinkler _____ Other (Identify) _____



Hydrant Flow Test Report

Location Elevated Water Tank Date 4-9-2010
Test made by SCOTT JACKSON Time 8:40
Representative of Palmetto State Utility Service Hydrant #: 7:06
Witness Roy Cuthbertson
State purpose of test Design Flow TEST . BCT III

Consumption rate during test _____

If pumps affect test, indicate pumps operating _____

A₁

A₂

A₃

A₄

Flow hydrants: 706 (Elevated water Tank)

Size nozzle 2.5

Pilot reading _____

Discharge coefficient (Total gpm): _____

gpm 1050 GPM @ 37 PSI

Static B 43 psi Residual B 41 psi

Projected results @ 20 psi Residual _____ gpm: or @ _____ psi Residual _____ gpm

Remarks Static "b" point used was HOSE Bib no Hydrant located on same line. Hose bib located at Elevated Water Tank inside fence.

Location map: Show line sizes and distance to next cross-connected line. Show valves and hydrant branch size. Indicate north. Show flowing hydrants - Label A₁, A₂, A₃, A₄. Show location of static and residual - Label B.

Indicate B Hydrant _____ Sprinkler _____ Other (Identify) HOSE BIB

Appendix E

IMSE-JAC-PWE-E (200-2)

29 April 2010

MEMORANDUM FOR Directorate of Public Works, Master Planning Division; ATTN: Michael Hipp

SUBJECT: Memorandum of Environmental Consideration (MOEC) for Basic Combat Training Complex III (10-0067)

1. The Environmental Division (ENV) has reviewed the subject project. The project must be completed as described in the signed Record of Environmental Consideration (REC) (encl 1) and as shown on the map (encl 2).
2. This MOEC is not an approval to begin the project; it outlines environmental and natural resource requirements only, as follows:
 - a. All drinking water and sewer line construction must be in compliance with the rules and regulations of the South Carolina Department of Health and Environmental Control (DHEC). If new water distribution lines or sewer collection lines are constructed other than service lines to or from the facility, a DHEC construction and operating permit may be required. For additional information contact Ed McDowell, ENV, at 751-6853.
 - b. Operation and maintenance of the Fort Jackson drinking water distribution system, to include all drinking water well systems, has been contracted (privatized) to Palmetto States Utility Services (PSUS). All installation units and activities must contact PSUS at 790-7288 before any tie-on, add-on, replacement, alteration, or repairs to any component of the privatized utility system.
 - c. If the proposed project includes the addition of an air emissions source(s) and/or the modification of an existing source(s), a construction permit or a construction permit exemption must be obtained from the South Carolina Department of Health and Environmental Control (DHEC), Bureau of Air Quality (BAQ). The construction permit or permit exemption must be received from BAQ prior to the initiation of this project. The permitting process may take as many as 180 days to complete. Coordinate with Christy Pollock, Air Quality, Environmental Management Branch at 751-6629 or christy.pollock@us.army.mil prior to any construction, and/or related construction, involving the addition or modification of an air emissions source(s).
 - d. Prior to completion of the proposed project, information pertaining to the unit(s) must be provided to Christy Pollock, Air Quality, Environmental Management Branch. This information is to include (but not limited to): unit location, construction/installation date, manufacturer, model, model number, serial number, rated kw/kva and/or heat input (all applicable), fuel source (natural gas, #2 diesel, electrical grid, etc), and manufacturer's suggested maintenance schedule. For additional information, contact Christy Pollock, at 751-6629 or christy.pollock@us.army.mil.

(continued on reverse side)

Thursday, May 27, 2010

IMSE-JAC-PWE-E (200-2)

SUBJECT: Memorandum of Environmental Consideration (MOEC) for Basic Combat Training Complex III (10-0067)

e. A Storm Water Permit is required. For specific requirements, contact Matt Holstein at 751-9504 or matthew.holstein@us.army.mil.

f. The proposed project area has been previously surveyed and contains no historic properties. The South Carolina State Historic Preservation Office concurs. If artifacts are discovered prior to or during construction or the proposed project location is redesigned, cease work in the subject area and contact Chan Funk, ENV, (803) 751-7153. Artifacts are Federal property and should not be collected or disturbed.

g. At least 90 days prior to tree removal, mark the clearing limits of the construction site and contact John Maitland, ENV, at 751-4622, so that arrangements can be made to harvest any merchantable timber. Tops, limbs, and small trees are the responsibility of the proponent, and must be disposed of in a mulch site. Merchantable timber remains the property of the Army.

h. This proposal required consultation with the United States Fish and Wildlife Service (USFWS) concerning its impacts to Red-cockaded Woodpeckers (RCWs) on Fort Jackson. A Biological Assessment (BA) was prepared and sent to the USFWS consulting on the proposed tree removal and impacts to RCW habitat. The USFWS has responded with a "no effect" determination. The proponent has been furnished a copy of the USFWS response. There are no endangered plant issues regarding this proposed project.

i. The contractor for the utility line work needs to contact the U.S. Army Corps of Engineers, Charleston District, Regulatory Field Office in Columbia, SC concerning authorization for crossing wetlands with utility lines. It appears a Nationwide Permit could be used for the utility line crossings. The US Environmental Protection Agency has delegated Section 404 regulatory authority in S.C. to the Charleston District Corps of Engineers. Their website is <http://www.sac.usace.army.mil/?action=regulatory.home>. Our point of contact in their Columbia office is Chip Ridgeway at 803-253-3906. For additional information, contact Stanley Rikard, ENV, at 751-5376.

k. All construction, renovation, and demolition projects require 50% minimum diversion of construction and demolition (C&D) waste, by weight, from landfill disposal. Contract specifications must include submission of a contractor's C&D Waste Management Plan. This plan must be approved by ENV prior to the start of site clearance. For additional information, contact Barbara Williams, ENV, at 751-6858.

l. Materials with recycled content must be used as much as possible. The U.S. Environmental Protection Agency web site (www.epa.gov/cpg/about.htm) has the latest product list and specific recycled content requirements for each product. For additional information, contact Barbara Williams, ENV, at 751-6858.

(continued on reverse side)

IMSE-JAC-PWE-E (200-2)

SUBJECT: Memorandum of Environmental Consideration (MOEC) for Basic Combat Training Complex III (10-0067)

m. The Energy Policy Act of 2005 requires Federal agencies to purchase Energy Star and Federal Energy Management Program (FEMP)-designated products. The U.S. Environmental Protection Agency database (<http://yosemite1.epa.gov/oppt/eppstand2.nsf>) provides links to contract language, specifications, and policies; environmental standards and guidelines; vendor lists of product brands; and other useful sources of information. For additional information, contact Barbara Williams, ENV, at 751-6858.

n. The contractor is responsible for managing hazardous substances IAW Federal, State, local, and military regulations. The Fort Jackson Hazardous Material and Waste Management (HMWM) Plan, dated August 2007, may be used for guidance. The HMWM Plan is located at <http://www.jackson.army.mil/ENRD/emb/HW%20F/HMWM.pdf>. The contractor is responsible for hazardous substance spill prevention, training, clean up, and reporting, and must comply with the Fort Jackson Spill Response Plan (page 15 of the HMWM Plan). For additional information, contact Barbara Williams, ENV, at 751-6858.

o. Yard waste and land-clearing debris must remain on-site or be taken to a compost or wood chipping facility; it may not be placed in a trash container. For additional information, contact Barbara Williams, ENV, at 751-6858.

p. One known Installation Restoration Program (IRP) concern exists near the proposed location. Area of Concern Q (AOC Q), a single monitoring well project is approximately 200 ft away on the west side of an intermittent stream. See attached map for location of the monitoring well. Caution must be taken to protect this well from any physical damage. Any release of fuel, oil, solvents or any chemicals should be reported immediately to Lahiri Estaba, ENV, at 751-7332.


3. The proposed project has been reviewed as required by the National Environmental Policy Act (NEPA) and AR 200-2. The Environmental Assessment of the Master Plan and Ongoing Mission (EAMP), dated February 2000, environmentally assessed the construction of Basic Combat Training Complex III. Requirements listed above must be followed to ensure compliance with applicable Federal and State environmental laws and regulations.

4. A new REC must be submitted if this project is modified or expanded in a manner that was not considered in this review or if the project has not been initiated within one year.

5. For additional information, contact Patrick Metts, ENV, at 751-4078 or william.p.metts@us.army.mil.

3 Encls

for


THOMAS L. ROBERTSON
Director of Public Works

Thursday, May 27, 2010

REC # 10-0067

1. Project Title

Trainee Barracks Complex Phase 1 -- Basic Combat Training 3 Phase 1 PN 48169

2. Proponent/Organization/POC (Name, address, phone number, and email address)

Michael Hipp, Chief, Master Planning DPW 2562 Essayons Way Ft. Jackson SC 29207 803-751-3829 michael.hipp@ us.army

3. How is this project being executed?

☐ DPW In House ☒ U.S. Army Corps of Engineers☐ Contractor ☐ Self Help Project☐ Other

4. Approximate date of when proposed action/project will be initiated: (Month/Year): SEP/10

5. Anticipated completion date and/or duration of proposed action: (Month/Year): APR/12

6. Approval of REC required by date: (Month/Year): MAR/10

7. Routine Repair/Maintenance & Small Construction Activities (Check all that apply):

☒ Tree Removal/Pruning? If so, how many trees to be removed:☒ New Construction☐ Interior building improvements (Renovations, demo walls, painting) Building and Room #☐ Replacement of Utilities☐ Roofing Materials Disturbance☐ Removing carpet☐ Replacing Tile☒ Soil/Land Disturbance☒ Disturbance of Ground Cover/Vegetation, Other Landscaping (plants, shrubs, adding gravel, etc.

If so, how many acres?

RECORD OF ENVIRONMENTAL CONSIDERATION (REC)
CANTONMENT AREA PROJECTS
Directorate of Public Works, Environmental Division (ENV)

8. Detailed description, Scope of Work (SOW) (Please explain any checked boxes):

Construct Phase 1 of a two-phase project to provide a standard-design 5 company Basic Combat Trainee (BCT) Complex. This Phase will consist of 3 standard open-bay barracks with company operations space. Phase 2, PN 58970 will consist of 2 company open-bay barracks, battalion headquarters with classrooms, running track/physical training pits, and a lawn maintenance building. Supporting facilities include all required utility systems and connections, information systems and alarm systems, connection to energy monitoring and control systems (EMCS) and intrusion detection system (IDS), standard anti-terrorism (AT) measures and landscaping. Sustainable Design and Development (SDD) and Energy Policy Act of 2005 (EPA05) features will be provided. Comprehensive interior furnishings and equipment design services are required in administration areas. Access for individuals with disabilities will be provided in administrative areas. Air

9. Provide a site specific map of the project area that shows the location relative to a prominent landmark such as a road or building.

PROPONENT
SIGNATURE

CONNOLLY.WILLIAM.MICHAEL.1326342285

Digitally signed by CONNOLLY.WILLIAM.MICHAEL.1326342285
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA,
cn=CONNOLLY.WILLIAM.MICHAEL.1326342285
Date: 2010.01.14 17:02:59 -05'00'

Submit

TO BE COMPLETED BY THE ENV DIVISION

REC # 10-0067

Needs to be reviewed by: ☒ WB ☒ FB ☒ EMB

Date Received Jan 15, 2010

Review Suspense Date Jan 22, 2010

Date REC Complete Feb 1, 2010

12. Reason for using Record of Environmental Consideration (choose one):

a. The proposed project is adequately covered in an EA/EIS entitled:

Fort Jackson Master Plan and Ongoing Mission dated 2000.

b. The proposed project is categorically excluded under the provisions of CX , 32 CFR Part 651, because:13. Project approved by DPTMS: ☐ YES ☐ NO ☒ NASignature
Director, DPTMS

Thursday, May 27, 2010

RECORD OF ENVIRONMENTAL CONSIDERATION (REC)
CANTONMENT AREA PROJECTS
Directorate of Public Works, Environmental Division (ENV)

Signature: National Environmental
Policy Act Coordinator,
Environmental Management Branch

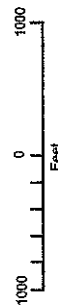
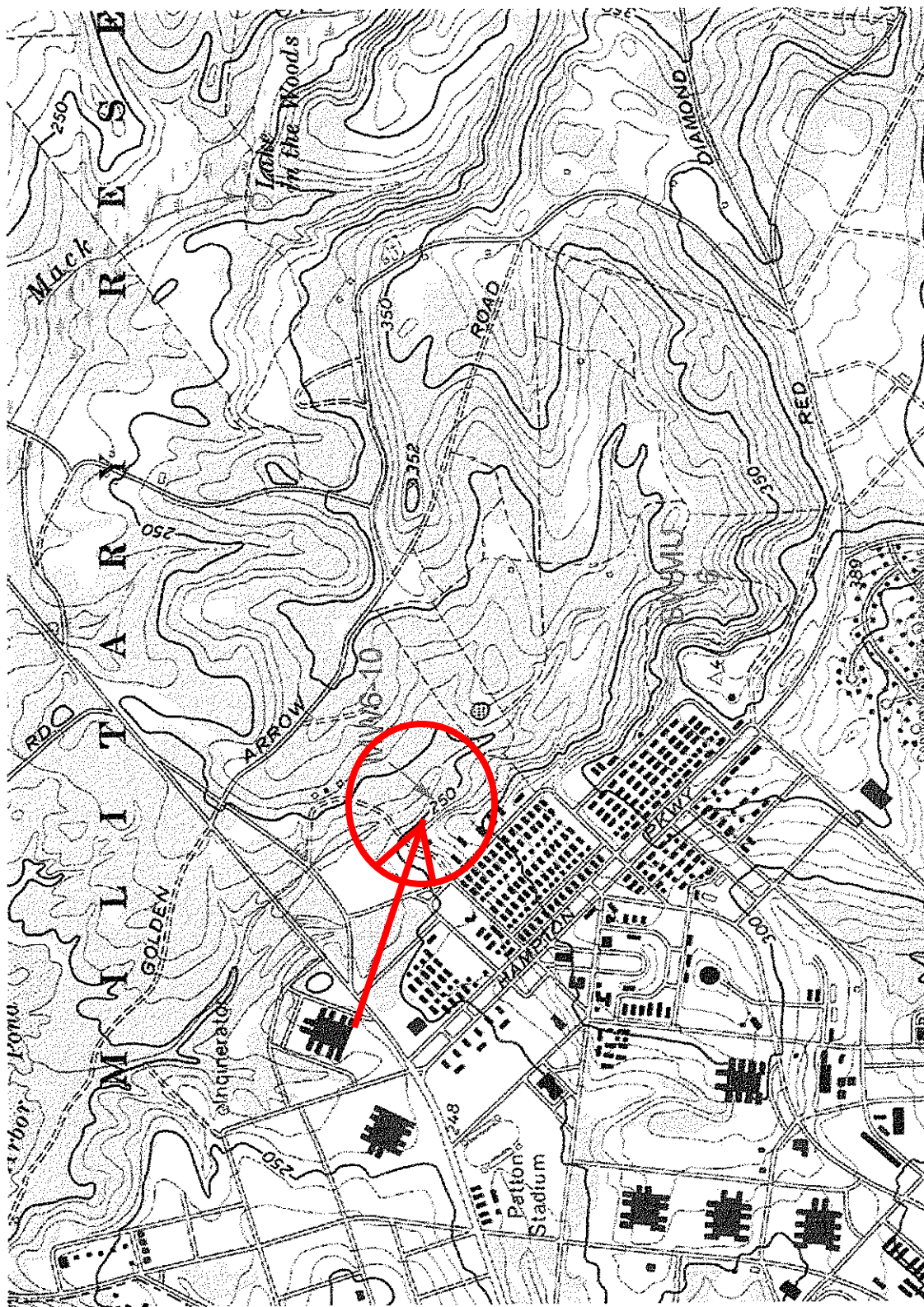
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Date: 2010.02.01 14:38:46 -05'00'

Signature: Branch Chief,
Environmental Management Branch

**BURGHARDT.WALLACE.
K.1060863543**

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CTSI
Geotechnical Engineering and Environmental Services
IRMO, SOUTH CAROLINA

FIGURE 1
Site Location Map

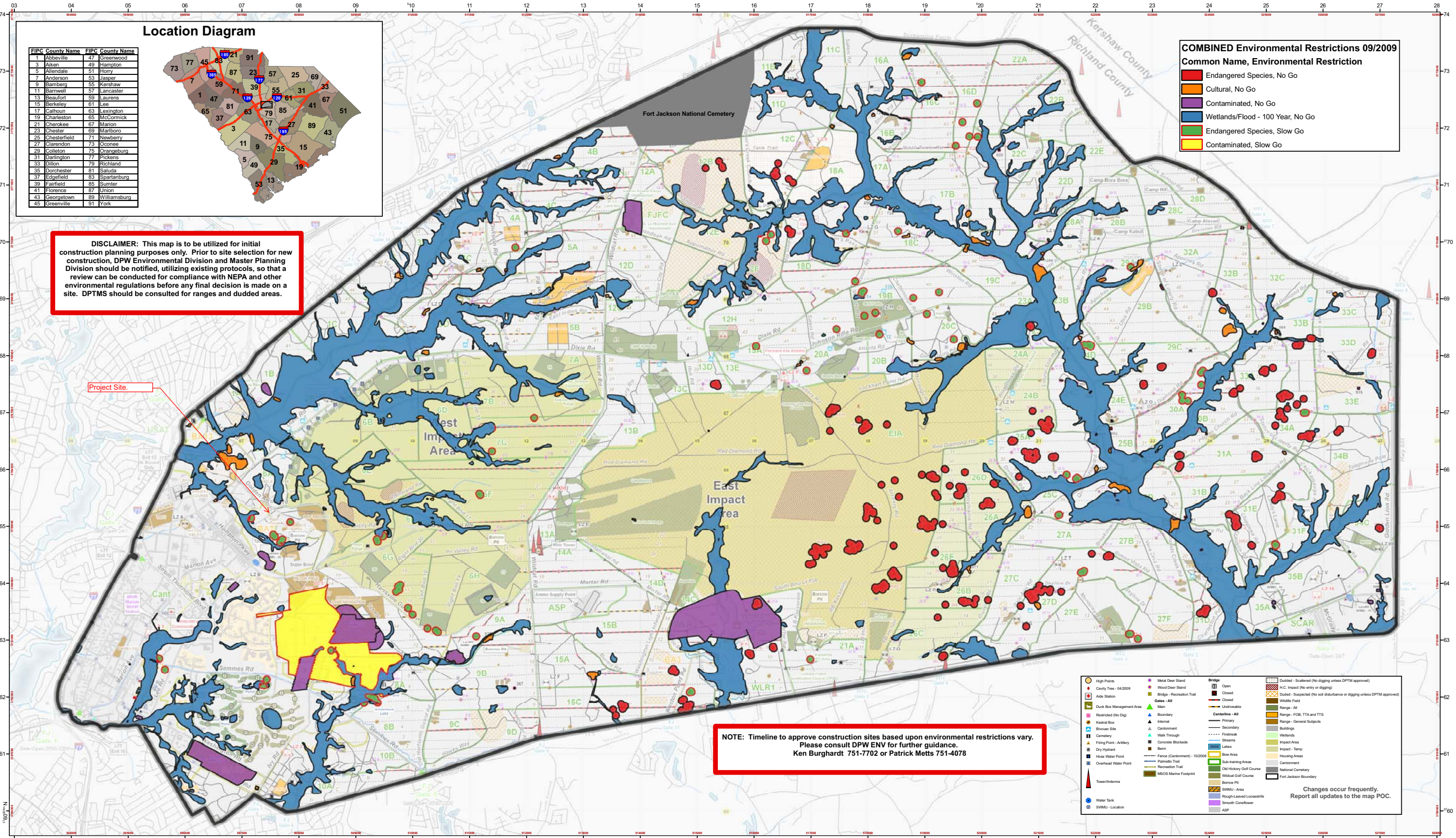
Date: FIGURE: Dwg:



2009 Environmental Restrictions to Construction

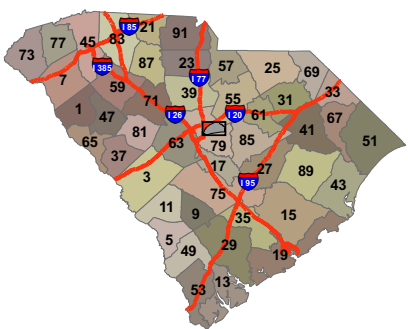
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EDITION 1



Location Diagram

FIPC County Name	FIPC County Name
1 Abbeville	47 Greenwood
2 Aiken	48 Hampton
3 Allendale	51 Horry
4 Anderson	53 Jasper
5 Bamberg	55 Kershaw
6 Barnwell	57 Lancaster
7 Beaufort	59 Laurens
8 Berkeley	61 Lee
9 Calhoun	63 Lexington
10 Charleston	65 McCormick
11 Cherokee	67 Marion
12 Chester	69 Marlboro
13 Chesterfield	71 Newberry
14 Clarendon	73 Oconee
15 Colleton	75 Orangeburg
16 Darlington	77 Pickens
17 Dillon	79 Richland
18 Dorchester	81 Saluda
19 Edgefield	83 Spartanburg
20 Fairfield	85 Sumter
21 Florence	87 Union
22 Georgetown	89 Williamsburg
23 Greenville	91 York



DISCLAIMER: This map is to be utilized for initial construction planning purposes only. Prior to site selection for new construction, DPW Environmental Division and Master Planning Division should be notified, utilizing existing protocols, so that a review can be conducted for compliance with NEPA and other environmental regulations before any final decision is made on a site. DPTMS should be consulted for ranges and duded areas.

COMBINED Environmental Restrictions 09/2009
Common Name, Environmental Restriction

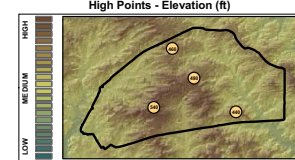
- Endangered Species, No Go
- Cultural, No Go
- Contaminated, No Go
- Wetlands/Flood - 100 Year, No Go
- Endangered Species, Slow Go
- Contaminated, Slow Go

NOTE: Timeline to approve construction sites based upon environmental restrictions vary. Please consult DPW ENV for further guidance. Ken Burghardt 751-7702 or Patrick Metts 751-4078

Legend

- High Points
- Cavity Tree - 04/2009
- Air Station
- Duck Box Management Area
- Restricted (No Dig)
- Kestrel Box
- Shoat Site
- Firing Point - Artillery
- Dry Hydrant
- Hose Water Point
- Overhead Water Point
- Tower/Antenna
- Water Tank
- SWMU - Location
- Metal Deer Stand
- Wood Deer Stand
- Bridge - Recreation Trail
- Gate - All
- Main
- Undrivable
- Boundary
- Internal
- Cantonment
- Cemetery
- Firing Point - Artillery
- Concrete Blockade
- Born
- Fence (Cantonment) - 10/2000
- Palmtoe Trail
- Old Military Golf Course
- Recreation Trail
- SWMU - Area
- Rough-Leaved Locusts
- Smooth Coneflower
- ASP
- Bridge
- Open
- Closed
- H.C. Impact
- Duded - Suspected (No soil disturbance or digging unless DPTMS approved)
- Wildlife Field
- Range - All
- Range - FOB, TTA and TTS
- Range - General Subjects
- Buildings
- Wetlands
- Impact Area
- Impact - Temp
- Housing Areas
- Cantonment
- National Cemetery
- Fort Jackson Boundary
- Duded - Scattered (No digging unless DPTMS approved)
- H.C. Impact
- Duded - Suspected (No soil disturbance or digging unless DPTMS approved)
- Wildlife Field
- Range - All
- Range - FOB, TTA and TTS
- Range - General Subjects
- Buildings
- Wetlands
- Impact Area
- Impact - Temp
- Housing Areas
- Cantonment
- National Cemetery
- Fort Jackson Boundary

Changes occur frequently. Report all updates to the map POC.



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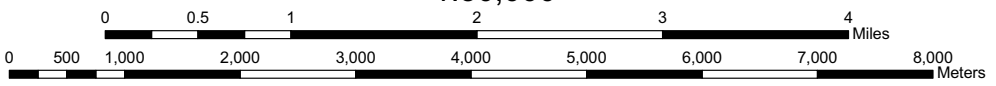
Date Published: Sep 2009
Map POC: Mr. Philip Claus
POC Number: 751-751-5856
Software: ArcGIS (ArcInfo) 9.2 SP6

WGS 1984 UTM Zone 17N
Projection: Transverse Mercator
Linear Unit: Meter
GCS: WGS_1984
Datum: WGS_1984

SPEED LIMIT
35 MPH Unless Otherwise Posted
10 MPH When Passing Troops

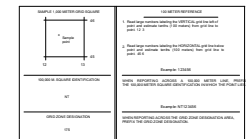
Scale Text is not accurate on maps sized up or down.

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TO CONVERT A GRID COORDINATE TO A MAGNETIC AZIMUTH
1. Subtract the Grid Angle from the Grid Azimuth.
2. Add the Result to the Magnetic Declination.

GRID CONVERSION
FOR CENTER OF SHEET



APPENDIX F

Photos of Surrounding Buildings, Architectural Theme and Exterior Colors









APPENDIX F ARCHITECTURE THEME AND COLOR SCHEME

Architectural Theme – Materials

Wall surfaces shall primarily be brick on administrative buildings, community facilities and mission support buildings. Other acceptable wall finishes may be any of the several cementitious material outlined on pages 1.5.2 and 1.5.3, but not more than two such additional materials on any one building. Good uses of these cementitious materials are fascias, columns and wall areas under deep overhangs. Roofs may be standing seam metal or in certain cases fiberglass shingles. For exact colors to be used refer to follow-on page.

Color and Materials

The purpose of this section is to identify the palette of colors and materials to be used throughout the Post. Specific design criteria for various materials will be discussed in this section. It is not the purpose of this section to discuss the applicability of the various materials for the different land use zones. Color and Materials will be discussed as relates to various building elements: roofs, walls, columns/pilasters, and trim.

Design Objectives

- A unification of design will be achieved by limiting the choices of color and materials, yet the range of choices is sufficient to allow for variety.
- Where colors are listed by a specific manufacturer, other equal materials with identical colors from other manufacturers are acceptable.
- Buildings shall not have more than three basic colors and materials, except for very limited use of a fourth accent color such as a trim band or entry canopy or awning.
- Buildings shall never have more than four basic materials and colors on any one facade, glazing excluded.
- Never change materials and/or colors in the same place unless separated by a deep reveal (2 deep by 3 1/2 wide minimum)
- Where selected, accent colors shall be used in very limited quantities. Accent colors shall be used on reveals, trim, window frames, canopies, awnings, etc. The use of accent colors is not required on any building.
- Match surrounding buildings color and materials & if the integrity is acceptable.
- All materials and equipment shall be free of any asbestos or components that contain asbestos particles.
- Lower visibility elements such as industrial buildings are to be painted with dark or receding colors.

Master Color Index

A full color Master Index showing all approved building, signage and site furnishings colors may be found in the Appendix of these Guidelines. All colors are taken from the Federal Standard Colors 595B and shall match the samples of that system.

MATERIALS	COLORS
Roofs	
Standing Seam	24373/20040
Fiberglass/Asphalt Composition Shingles	Equal in color to GAF Royal Sovereign Series* Fed #s with note.
Walls (The term “walls” will include all vertical surfaces including large fascia area but not including glazing. Walls shall include sharply slanted or corbelled surfaces such as might occur above or below glazing.)	
Brick (Coordinate current brick colors in use)	
Split-face concrete masonry units	20313 / 20372 / 27780
Stucco	20313 / 20372 / 27780
Synthetic Stucco	20313 / 20372 / 27780
Concrete	20313 / 20372 / 27780
Vinyl Siding	2378 / 26492 / 25526 / 27880 / 20372 / 23717 *
Metal Siding	23522 / 24373 / 20040 / 20152*
Wood Siding	23717 / 20372*
Columns or Pilasters	
Brick (Coordinate current brick colors in use)	
Split-face CMU's	Color to be integral as manufactured and to be approved by DEH.
Stucco	20313 / 20372 / 27780
Synthetic Stucco	20313 / 20372 / 27780
Concrete	20313 / 20372 / 27780
Metal Squared Tubing	20313 / 20372 / 27780 / 20040
Trim (Include such items as fascias, corner trim, door and window trim and in some cases flashing. Trim materials are listed in order of priority, based on long term disability.)	
Vinyl	20372 / 23717
Aluminum	20059 / 23717 / 20372 / 21136 * (accent only)
Painted Wood	20372 / 20059 / 23717 / 21136* (accent only)
Canvas Awning & Canopys	23655 / 25180 / 24108 / 20061

*Manufacturer color to match Federal #'s as close as possible and address on case by case by DEH.

COLOR INDEX

Buildings & Courtyards



*Gloss/Semi-Gloss

APPENDIX G GIS Data

Not Used

APPENDIX H

Exterior Signage











**A Company
2nd Battalion
39th Infantry Regt**

10402

Commander

CPT FLANERY

First Sergeant

1SG MARTINEZ

APPENDIX H EXTERIOR SIGNAGE

General Information

The following series of signs and specifications has been developed specifically taken from TM5-807-10, *Signage*, H.Q.D.A. December 1983, and from the recently developed TRADOC Regulation No. 420-14, *Facilities Engineering Exterior Sign Standards*. Several of the signs shown in the following system have been designed for this Post, are not shown in either of the sources listed, and are unique to this installation. Several other signs in this system are to replace signs shown in either or in both sources, such as the sign for naming streets. The system of signs shown in this design guide shall take precedence over all other sources, technical manuals or regulations. This system is however, restricted to the typical basic signs normally needed on Post and there may be a need for a sign type or size that is not shown in this guide. When such a case occurs, or when the design, construction, or placement information presented herein is not sufficient, additional information is to be taken first, from TRADOC Regulation No. 420-14 and second from TM5-807-10

Colors and Materials

All colors to be used are taken from standards developed by the Federal Administration, and include the equivalent Federal Standard 595a number as well as the Pantone Matching System number, which can be found in the Appendix in the Color Index. All signs shall be standard white vinyl die-cut letters on standard brown baked enamel aluminum posts, unless otherwise noted. Alkyd, epoxy or urethane enamels may be used. Reflective or vinyl sheeting and reflective graphics on reflective sheeting may be used when approved by the D.E.H. Steel, polycarbonate or exterior plywood sign panels and steel or wood sign posts may be used when approved by the D.E.H.

Traffic Symbols

All traffic signs and symbols shall conform to those designated in the manual "Uniform Traffic Control Devices 1978 by the U.S. Department of Transportation Federal Highway Administration.

Illumination

All signs may be illuminated with non glare light sources that are not apparent in daylight hours such as indirect or below grade weather proof lights. Light shall be restricted to the sign panel only and shall be evenly distributed.

MASTER PLAN. In order to assure that all installation signage communicates clearly in an efficient and systematic way, it is strongly recommended that an Installation or Small Area sign master plan be prepared. This plan should show the location and content of every proposed exterior identification, guide, mandatory/prohibitory, and informational sign on the Installation. The plan consists of two parts, the sign location plan and the sign schedule.

A. Sign Location Plan. The sign location plan should be prepared using a current site plan of the Installation showing all structures and other major features. To prepare a sign location plan, determine the message content, sign type, and preliminary location of each required sign. Field verify the preliminary locations, and if necessary modify the locations to accommodate existing conditions. Assign and record a sequential number for each sign on the sign location plan.

B. Sign Schedule. After preparation of the sign location plan, a sign schedule should be prepared indicating all signs required or proposed using the assigned location numbers.

The system is comprised of a logical progression of sign types which guide travel to activities or facilities through orientation to major routes within the Installation and identification of each destination. The basic sequence consists of

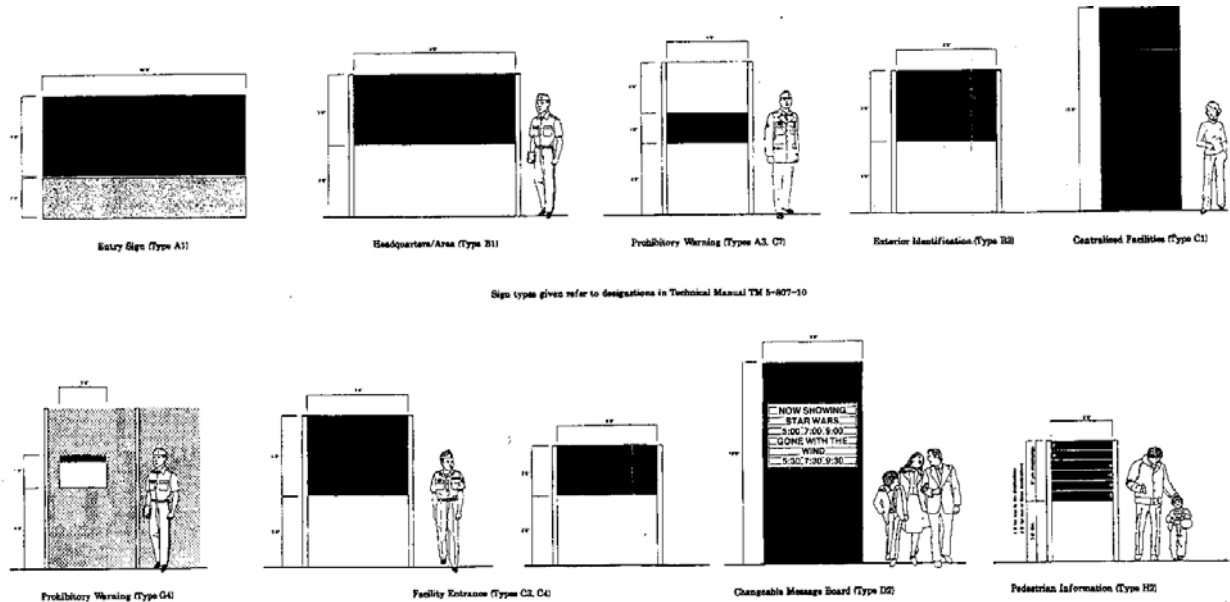
- Identification of the Installation.
- Notification of security enforced on the Installation.
- Identification of the major units stationed at the Installation.
- Orientation to the site.
- Direction to destinations via street names and addresses.
- Identification of destinations.

This progression of signs is supplemented as required with informational, motivational, and mandatory/prohibitory signage. Consistent and widely understood nomenclature must be used on all signs to avoid confusion. Colors to be used are to be standard brown (30099) for sign boards with white (27875) die-cut reflective letters except where otherwise noted.

EMBLEMS Standard colors for Army signage are listed in tables 2-1 and 2-2. Colors for military emblems must be in accordance with The Institute of Heraldry, US Army, HQDA (DAAG-HDZ-A), Cameron Station, 5010 Duke Street, Alexandria, Virginia 22314, whose specifications utilize colors from the Standard color card of America, the Color Association of the United States, Inc. Branch colors are listed in table 2-1 in accordance with AR 670-1.

Standard colors developed for the Federal Highway Administration are utilized on guide and mandatory/prohibitory signs. Colors for safety are in accordance with AR-385-30. Paints, inks, and reflective sheeting materials used in the production of signs must match the standard colors.

SIGN TYPES:



Typography

Two typefaces are used in the signage system: Helvetica medium and Helvetica regular (with the exception of traffic control signs which follow guidelines in Standard Alphabets for Highway Signs and Pavement Markings published by the Federal Highway Administration). Since typefaces are not completely standardized in the printing and signage industries, any typeface being considered must be visually matched with examples shown:

- A. Helvetica Medium. Helvetica medium is the primary system typeface and is used for major information on all signs.

ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz

1234567890\$G%/(&.,, , .., ",,,-:) . .

- B. Helvetica Regular. Helvetica regular is used for secondary information on signs and for translations of foreign languages using roman characters. Helvetica regular is never used in a situation requiring arrows.

ABCDEFGHIJKLMNOPQRSTUVWXYZ

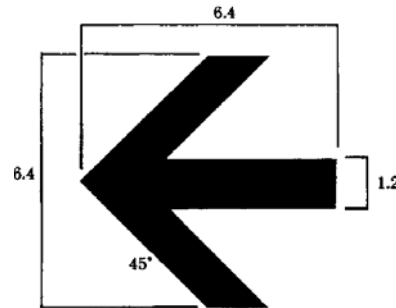
abcdefghijklmnopq rst uvwxyz

1234567890\$C%/(&.,, , ""!I? =-~)

- C. **Letter Spacing.** Application of letters should be proportionately spaced to maintain visually equal spacing and alignment. Mechanically equal spacing will not be used.

1. **Letter Spacing Standards.** Letter spacing standards should be followed for both Helvetica medium and Helvetica regular typefaces. These standards are based on a unit system. Each unit is equivalent to 1/50th of the capital letter height.
2. **Tiles Systems.** Adhesives-backed vinyl die.-cut letters supplied on proportionately sized paperboard tiles are an alternative letter spacing method. These tiles are notched to assure vertical alignment. The tiles are placed next to each other, lining up the alignment notches with the grid lines drawn on the sign face. Tile systems allow installations personnel to prepare professional quality signs with minimal training. Since letters are available individually, any message can be prepared as required, provided that an inventory of character tiles is maintained.
3. **Pre-spaced system.** Adhesive-backed vinyl die-cut letters, pre-spaced and aligned on a transparent carrier sheet, are another alternative letter spacing method. This allows installation personnel to prepare professional quality signs quickly with minimal training. No inventory is required; however, lead time is necessary for manufacturers to prepare ordered messages.

- D. **Standard arrows.** All guide and informational signage intended for pedestrian use, either exterior or interior, must use the arrow shown.



CAPITAL LETTER HEIGHT=5.0

E. Layout Guidelines.

1. Good judgment is the key to deciding where the lines should break in a sign message. Single ideas or names should appear on the same line, as follows:

- a. Headquarters
Fort McPherson
- b. Not,
Headquarters
Fort McPherson

2. Names should be spelled out in full whenever possible, unless otherwise specified in the authorized unit name, as follows:

- a. 4th Infantry Division
- b. 4th Battalion 61st ADA

If abbreviations are required, they must be in accordance with AR 310-50.

3. Numbers should be used for the titles of military units except corps, which are designated by Roman numerals, and armies, which are spelled out in accordance with AR 340-15, as follows:

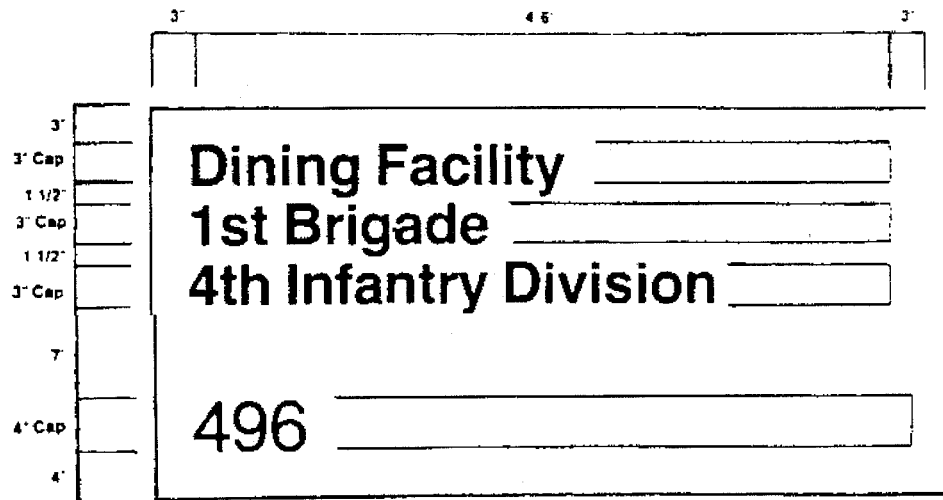
- a. Eighth US Army
- b. 56th Artillery Brigade

4. Line breaks should be balanced, as follows:

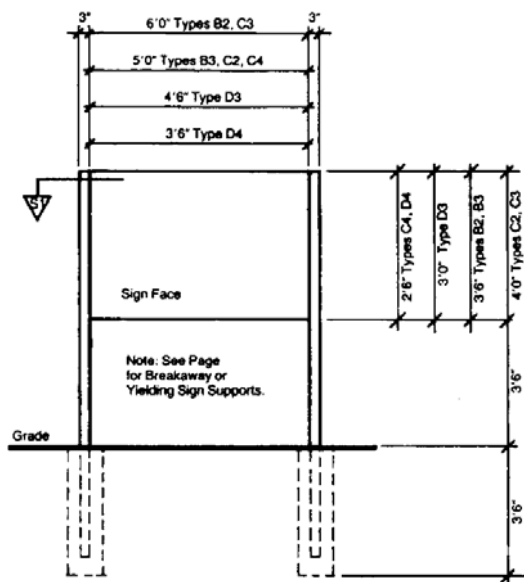
- a. Material Development and Readiness Command
- b. Engineering Plans/Real Property
- c. United States Post Office
- d. Authorized
- e. Training and Doctrine Command

Facility Entrance : Sign 'Types a, C4

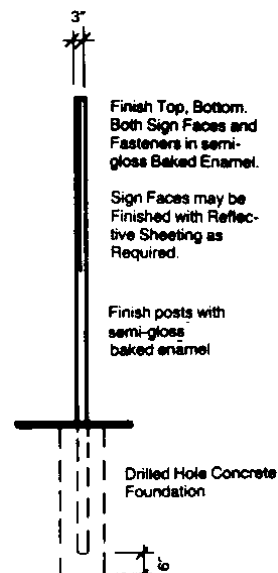
To be used at: Secondary centralized military and community facilities, primary military and community facilities, areas of warning, vehicular directional information, and for standard morale signs.



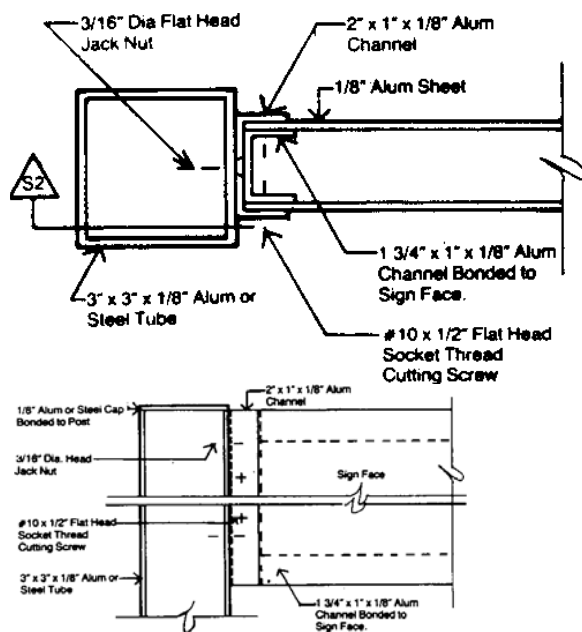
Thursday, May 27, 2010



Front Elevation: Sign Types 82.83,C 2, C3,C4.D3.



Section: S1 Horizontal

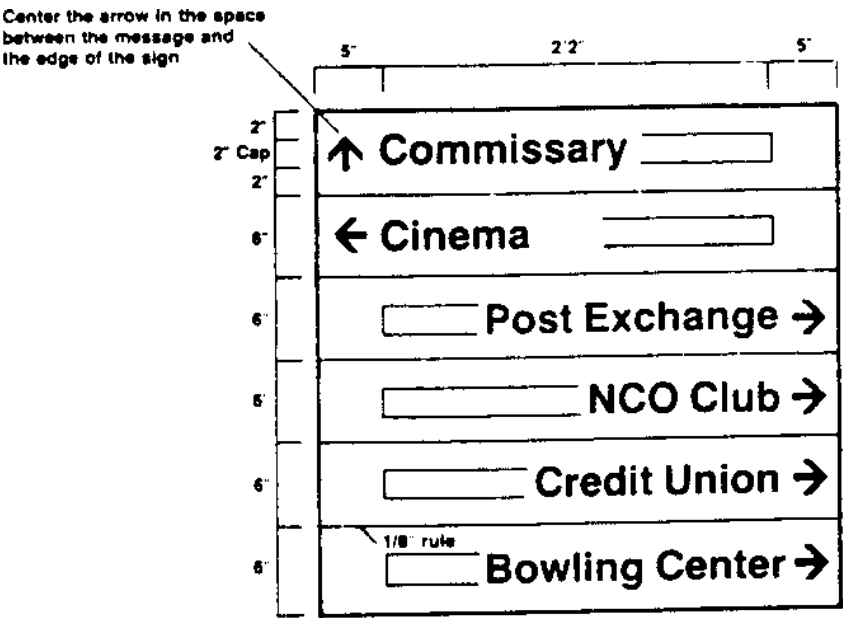
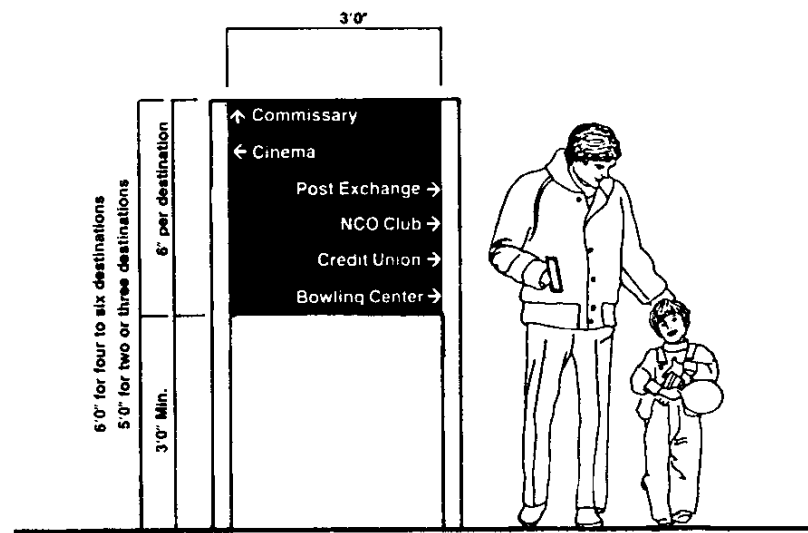


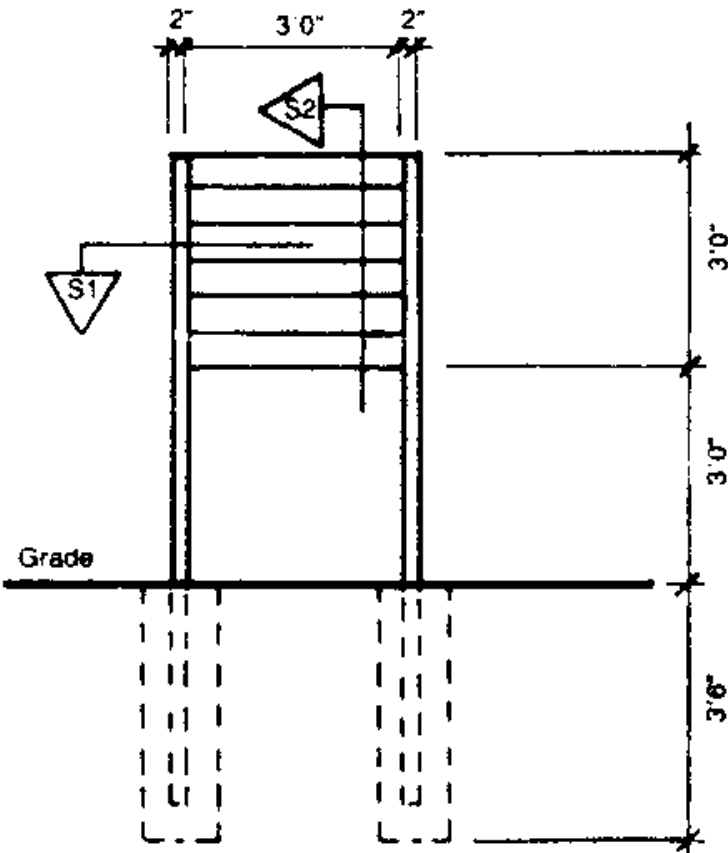
Horizontal Section S2



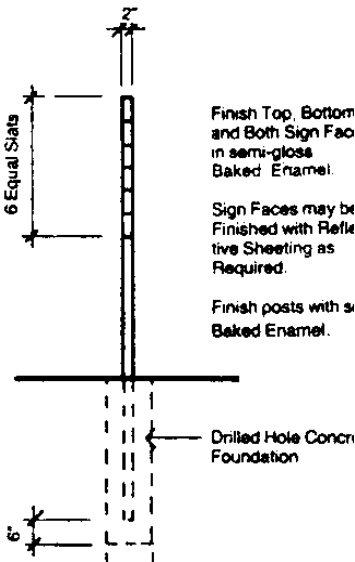
Pedestrian Information

To be used for pedestrian, and bicycles path directional information.





Front Elevation Sign Type H2



Section

End of Appendix H

APPENDIX I
Acceptable Plants List

Section: APPENDIX I

[Not Supplied]
Page 207 of 636Vines:

DESCRIPTION										CULTURE										USE								
Group:	Evergreen																											
	Deciduous																											
Growth rate:	Fast																											
	Moderate																											
Texture:	Coarse																											
	Medium																											
	Fine																											
Flowering:	Yes																											
Form:	Spreading																											
Exposure:	Sun																											
	Semi-Shade																											
	Shade																											
Moisture Requirement:	High																											
	Medium																											
	Low																											
	Well-drained																											
Pest/Disease:	Subject																											
	Not Subject																											
Soil Fertility:	High																											
	Medium																											
	Low																											
Environmental:	Erosion																											
	Shade																											
	Transitional/Natural																											
Visual:	Ornamental																											
	Screen-Tall																											
	Screen-Low																											

Botanical Name																												
Common Name																												
Ampelopsis brevipedunculata Ampelopsis																												
Campsis radicans Trumpet creeper																												
Clematis sp. Clematis																												
Gelsemium sempervirens Carolina Jessamine																												
Nedera helix English Ivy																												
Lonicera sp. Honeysuckle																												
Vitis sp. Grape																												
Rosa hybrida Climbing Rose																												
Parthenocissus quinquefolia Virginia Creeper																												

Turf:

	DESCRIPTION										CULTURE										USE																								
	Group	Evergreen	Deciduous	Growth rate	Fast	Moderate	Slow	Texture	Coarse	Medium	Fine	Flowering	Yes	Form	Horizontal	Pyramidal	Irregular	Upright	Spreading	Exposure	Sun	Semi-Shade	Shade	Moisture Requirement	High	Medium	Low	Well-drained	Pest/Disease	Subject	Not Subject	Soil Fertility	High	Medium	Low	Environmental	Erosion	Shade	Transitional/Natural	Visual	Ornamental	Screen-Tall	Screen-Low		
Botanical Name																																													
Common Name																																													
<i>Pachysandra terminalis</i>																																													
Japanese Spruce																																													
<i>Vinca major</i>																																													
Periwinkle																																													
<i>Vinca minor</i>																																													
Periwinkle																																													
<i>Euonymus fortunei 'radicans'</i>																																													
Wintercreeper																																													
<i>Phlox subulata</i>																																													
Thrift																																													

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[Not Supplied]

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	DESCRIPTION												CULTURE										USE														
	Group: Evergreen	Deciduous	Growth rate: Fast	Moderate	Slow	Texture: Coarse	Medium	Fine	Flowering: Yes	Form: Horizontal	Rounded	Oval	Irregular	Upright	Spreading	Weeping	Exposure: Sun	Semi-Shade	Shade	Moisture Requirement: High	Medium	Low	Well-drained	Pest/Disease: Subject	Not Subject	Soil Fertility: High	Medium	Low	Environmental: Erosion	Shade	Transitional/Natural	Visual: Street Trees	Ornamental	Screen-Tall	Screen-Low		
Botanical Name																																					
Common Name																																					
<i>Forsythia</i> sp. Golden Bells																																					
<i>Ilex cornuta</i> <i>burfordi</i> Burford Holly																																					
<i>Ilex cornuta</i> <i>rotunda</i> Chinese Holly																																					
<i>Ilex crenata</i> <i>compacta</i> Japanese Holly																																					
<i>Ilex crenata</i> "Helleri" Heller Japanese Holly																																					
<i>Ilex crenata</i> <i>microphylla</i> Japanese Holly																																					
<i>Ilex vomitoria nana</i> Yaupon Holly																																					
<i>Juniperus</i> sp. Juniper																																					
<i>Ligustrum</i> sp. Privet																																					

DESCRIPTION	CULTURE	USE
Deciduous		
Growth rate: Fast		
Moderate		
Slow		
Texture: Coarse		
Medium		
Fine		
Flowering: Yes		
Form: Horizontal		
Rounded		
Oval		
Irregular		
Upright		
Spreading		
Weeping		
Exposure: Sun		
Semi-Shade		
Shade		
Moisture Requirement: High		
Medium		
Low		
Well-drained		
Pest/Disease: Suscept		
Not Suscept		
Soil Fertility: High		
Medium		
Low		
Environmental: Erosion		
Shade		
Transitional/Natural		
Visual: Street Trees		
Ornamental		
Screen-Tall		
Screen-Low		

[illegible]

[Not Supplied]

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		DESCRIPTION															CULTURE										USE														
		Growth	Evergreen	Deciduous	Growth rate: Fast	Moderate	Slow	Texture: Coarse	Medium	Fine	Flowering: Yes	Form: Horizontal	Rounded	Oval	Pyramidal	Columnar	Irregular	Upright	Spreading	Weeping	Exposure: Sun	Semi-Shade	Shade	Moisture Requirement: High	Medium	Low	Well-drained	Pest/Disease: Subject	Not Subject	Soil Fertility: High	Medium	Low	Environmental: Erosion	Shade	Transitional/Natural	Visual: Street Trees	Ornamental	Screen-Tall	Screen-Low		
Common Name																																									
	<i>Quercus coccinea</i> Scarlet Oak																																								
*	<i>Quercus falcata</i> Southern Red Oak																																								
*	<i>Quercus nigra</i> Water Oak																																								
	<i>Quercus palustris</i> Pin Oak																																								
*	<i>Quercus phellos</i> Willow Oak																																								
	<i>Quercus stellata</i> Post Oak																																								
*	<i>Quercus virginiana</i> Live Oak																																								
	<i>Sassafras albidum</i> Sassafras																																								
	<i>Salix nigra</i> Black Willow																																								
	<i>Zelkova serrata</i> Zelkova																																								

Shrubs:

DESCRIPTION											CULTURE											USE			
Deciduous											Moisture Requirement: High											Environmental: Erosion			
Growth rate: Fast											Medium											Shade			
Moderate											Low											Transitional/Natural			
Slow											Well-drained											Visual: Street Trees			
Texture: Coarse											Pest/Disease: Subject											Ornamental			
Medium											Not Subject											Screen-Tall			
Fine											Soil Fertility: High														
Flowering: Yes											Medium														
Form: Horizontal											Low														
Rounded																									
Oval																									
Pyramidal																									
Columnar																									
Irregular																									
Upright																									
Spreading																									
Weeping																									
Exposure: Sun																									
Semi-Shade																									

Section: APPENDIX I

[Not Supplied]
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	Botanical Name Common Name	DESCRIPTION																CULTURE								USE													
		Group: Evergreen	Deciduous	Growth rate: Fast	Moderate	Slow	Texture: Coarse	Medium	Fine	Flowering: Yes	Form: Horizontal	Rounded	Oval	Pyramidal	Columnar	Irregular	Upright	Spreading	Weeping	Exposure: Sun	Semi-Shade	Shade	Moisture Requirement: High	Medium	Low	Well-drained	Pest/Disease: Suscept	Not Suscept	Soil Fertility: High	Medium	Low	Environmental: Erosion	Shade	Transitional/Natural	Visual: Street Trees	Ornamental	Screen-Tall	Screen-Low	
*	<i>Diospyros virginiana</i> Persimmon																																						
	<i>Ginkgo biloba</i> Ginkgo																																						
	<i>Ilex decidua</i> Possumhaw																																						
*	<i>Ilex opaca</i> American Holly																																						
*	<i>Juniperus virginiana</i> Red Cedar																																						
*	<i>Lagerstroemia indica</i> Crape Myrtle																																						
*	<i>Liquidambar styraciflua</i> Sweetgum																																						
*	<i>Liriodendron tulipifera</i> Tulip Tree																																						
	<i>Magnolia grandiflora</i> Magnolia																																						

- * Leyland Cypress - *Cupressocyparis leylandii*
 * Eastern Red bud - *Cercis canadensis*
 * Flowering Dogwood - *Cornus florida*

Section: APPENDIX I

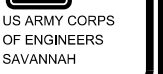
APPENDIX I
ACCEPTABLE PLANTS LIST

Plant Material

The following charts are guides for the selection of plant material for new plantings on Post. Their purpose is to aid professionals in selecting hardy, durable plants that will withstand the type of maintenance available on Post. The lists provide a broad selection of plants that can be used for most design situations. However, within the Installation there are various microclimates that must be considered when choosing a species. Professional recommendations are to be reviewed and approved by qualified personnel on Post prior to installation. As regional climate fluctuates and new diseases and insects move into the area, certain plants may need to be eliminated from the lists. Likewise, as new plant varieties and species become available, the lists will need to be updated.

Trees:

	DESCRIPTION																			CULTURE										USE											
	Group	Evergreen	Deciduous	Growth rate: Fast	Moderate	Slow	Texture: Coarse	Medium	Fine	Flowering: Yes	Form: Horizontal	Rounded	Oval	Pyramidal	Columnar	Irregular	Upright	Spreading	Weeping	Exposure: Sun	Semi-Shade	Shade	Maintenance Requirement: High	Medium	Low	Well-drained	Pest/Disease Suscept	Not Subject	Soil Fertility: High	Medium	Low	Environmental: Erosion	Shade	Transitional/Natural	Visual: Street Trees	Ornamental	Screen-Fall	Screen-Low			
Botanical Name																																									
Common Name																																									
Acer negundo																																									
Boxelder																																									
Acer rubrum																																									
Red Maple																																									
Acer saccharum																																									
Sugar Maple																																									
Aesculus pavia																																									
Red Buckeye																																									
Betula nigra																																									
River Birch																																									
Carya illinoensis																																									
Pecan																																									
Celtis laevigata																																									
Sugarberry																																									
Celtis occidentalis																																									
Hackberry																																									
Crataegus marshallii																																									
Hawthorn																																									



1. CONTRACTOR SHALL COMPLETE A MAINTENANCE AND PROTECTION OF TRAFFIC PLAN AND OBTAIN APPROVAL FROM FT. JACKSON PRIOR TO CONSTRUCTION.
2. CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL MEASURES.
3. CONTRACTOR SHALL COORDINATE TRAFFIC CONTROLS WITH FT. JACKSON.

[illegible]

U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS SAVANNAH DISTRICT	DESIGNED BY: G. STEVART	DATE: 2/27/2010
	CAD BY: T. SUEDEMAN	PROJECT NO. A SERIAL NO. 465-REF0005
	SUBMITTED BY: T. SUEDEMAN	CONTRACT NO.2
	FILE NAME:	CATEGORY CODE: 711-81-07
BURNS & McDONNELL 9400 WARD PARKWAY KANSAS CITY, MISSOURI	SIZE D: 22"x34"	PLOT DATE:

HAUL ROUTE PLAN

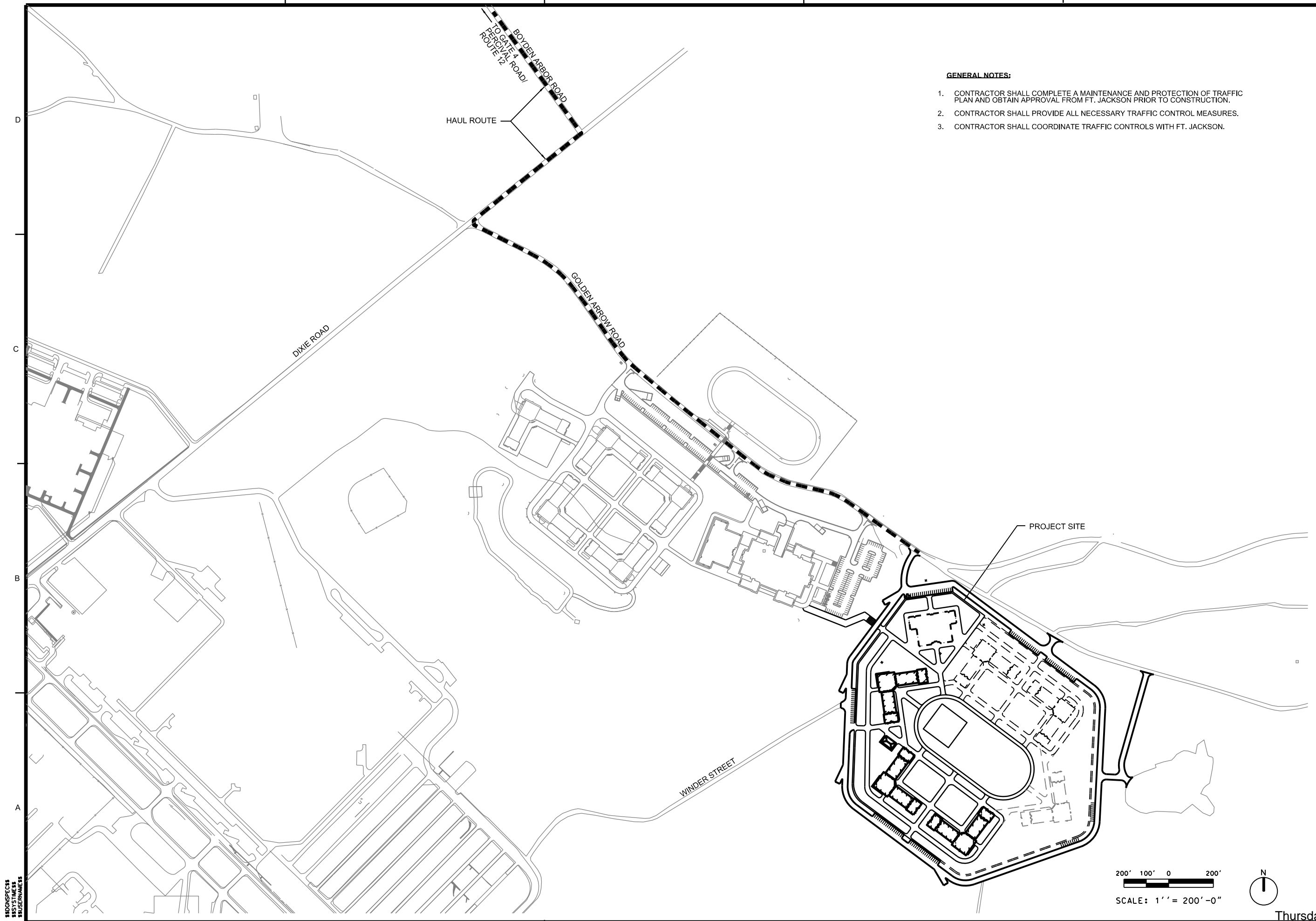
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REFERENCE
NUMBER
GC101
SHEET 02

Thursday, May 27, 2010

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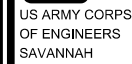
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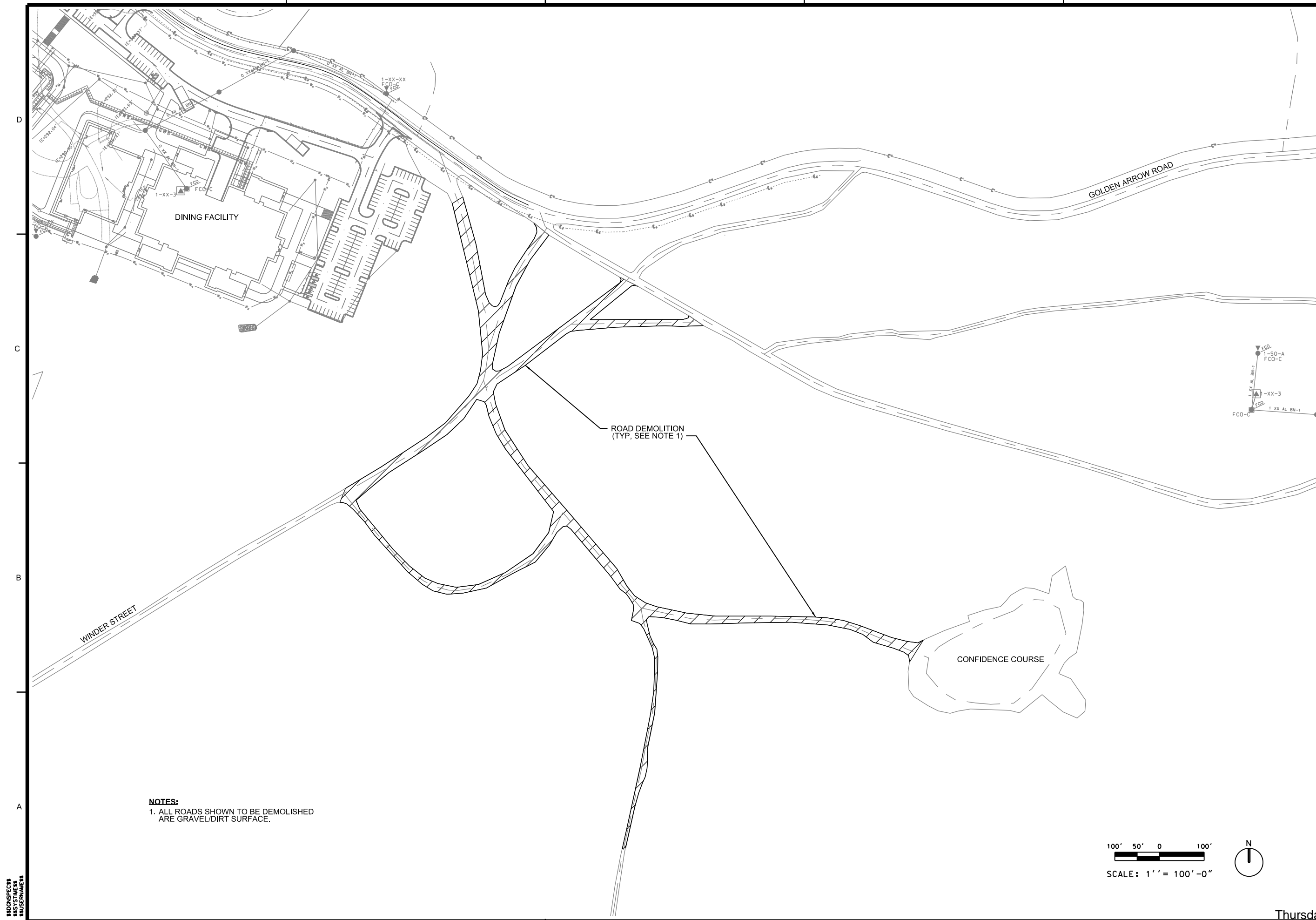
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	BUILT BY: C. STEVART	CAD BY: SEFAR/AM/045-RFP0005
	SUBMITTED BY: T. SUERWANN	CONTRACT NO.2
BURNS & McDONNELL 9400 WARD PARKWAY KANSAS CITY, MISSOURI	FILE NAME: 22F334	CATEGORY CODE: 721-81-07
	SIZE/D: 22F334	PLOT DATE:

BASIC TRAINING COMPLEX III BARRACKS/
COMPANY OPERATIONS FACILITY (B/COF)
FORT JACKSON, SOUTH CAROLINA

PLATE
REFERENCE
NUMBER
CD101
SHEET 03

Thursday, May 27, 2010

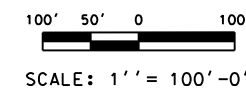


NOTES:

1. ALL ROADS SHOWN TO BE DEMOLISHED ARE GRAVEL/DIRT SURFACE.

— ROAD DEMOLITION
(TYP, SEE NOTE 1)

CONFIDENCE COURSE



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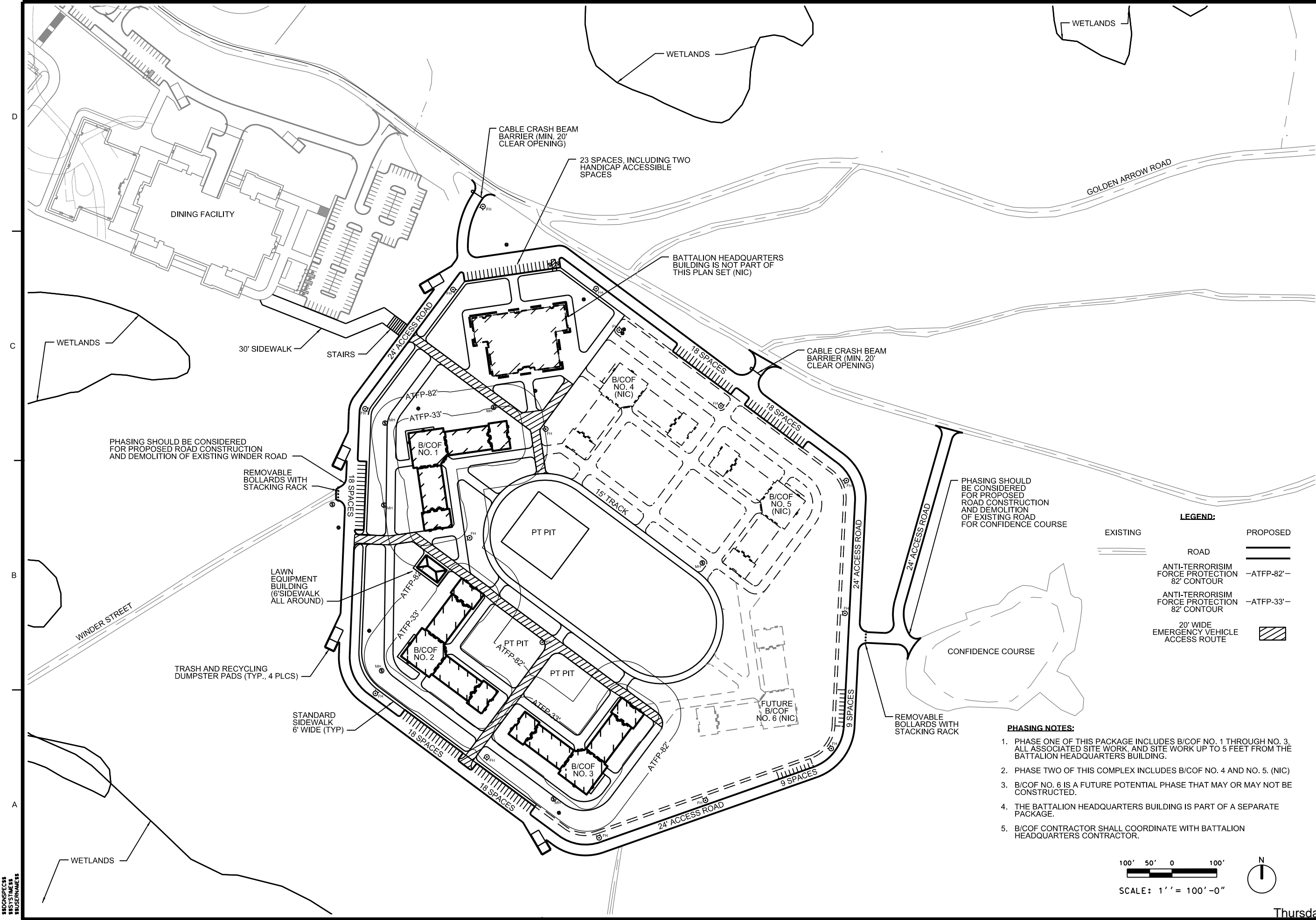
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US ARMY CORPS
OF ENGINEERS
SAVANNAH

DESIGNED BY:	DATE:	SUBMITTAL NO.:	CONTRACT NO.:	SYMBOL	DATE	BY
C. STEWART	22 MARCH 2010	SER-ABW-0145-RFP0005	72145-001			
DWN BY:						
U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS SAVANNAH DISTRICT						
BURNS & McDONNELL 9400 WARD PARKWAY KANSAS CITY, MISSOURI						

BASIC TRAINING COMPLEX III BARRACKS/
COMPANY OPERATIONS FACILITY (B/COF)
FORT JACKSON, SOUTH CAROLINA

OVERALL SITE
LAYOUT PLAN

PLATE
REFERENCE
NUMBER
CS101

SHEET 24 OF 24

100' 50' 0 100'

SCALE: 1" = 100'-0"

N

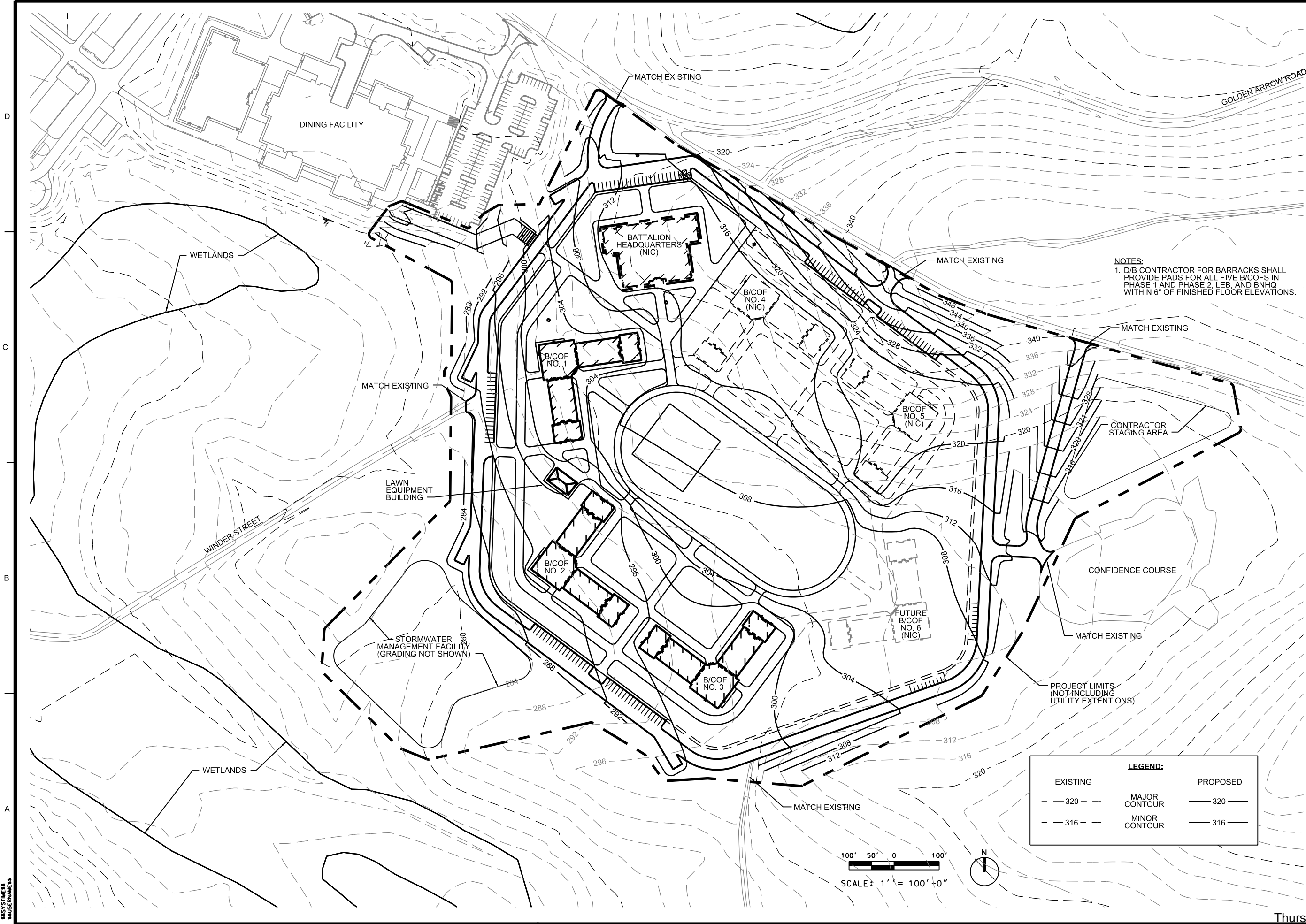
THURSDAY, MAY 27, 2010

THURSDAY, MAY 27, 2010

1100NSPEC11

11SYTIME11

11USERAME11



NOTES:
1. D/B CONTRACTOR FOR BARRACKS SHALL PROVIDE PADS FOR ALL FIVE B/COFS IN PHASE 1 AND PHASE 2, LEB, AND BNHQ WITHIN 6" OF FINISHED FLOOR ELEVATIONS.

LEGEND:		
EXISTING		PROPOSED
--- 320 ---	MAJOR CONTOUR	— 320 —
--- 316 ---	MINOR CONTOUR	— 316 —

100' 50' 0 100'
SCALE: 1" = 100' ± 0"



US ARMY CORPS OF ENGINEERS SAVANNAH

SYMBOL	DATE	BY

DESIGNED BY: C. STEWART
DWN BY: BAH
SUBMITTED BY: T. SUEWANN
FILE NAME: 7/14/10

DATE: 22 MARCH 2010
SOLICITATION NO.: SER-ABW-0145-RFP0005
CONTRACT NO.: 7/14/10
CATEGORY CODE: 7/14/10

SIZE: D
PLOT SCALE: 22/34"

DATE: 22 MARCH 2010
SOLICITATION NO.: SER-ABW-0145-RFP0005
CONTRACT NO.: 7/14/10
CATEGORY CODE: 7/14/10

U. S. ARMY ENGINEER DISTRICT SAVANNAH DISTRICT
CORPS OF ENGINEERS
BURNS & MCDONNELL
9400 WARD PARKWAY
KANSAS CITY, MISSOURI

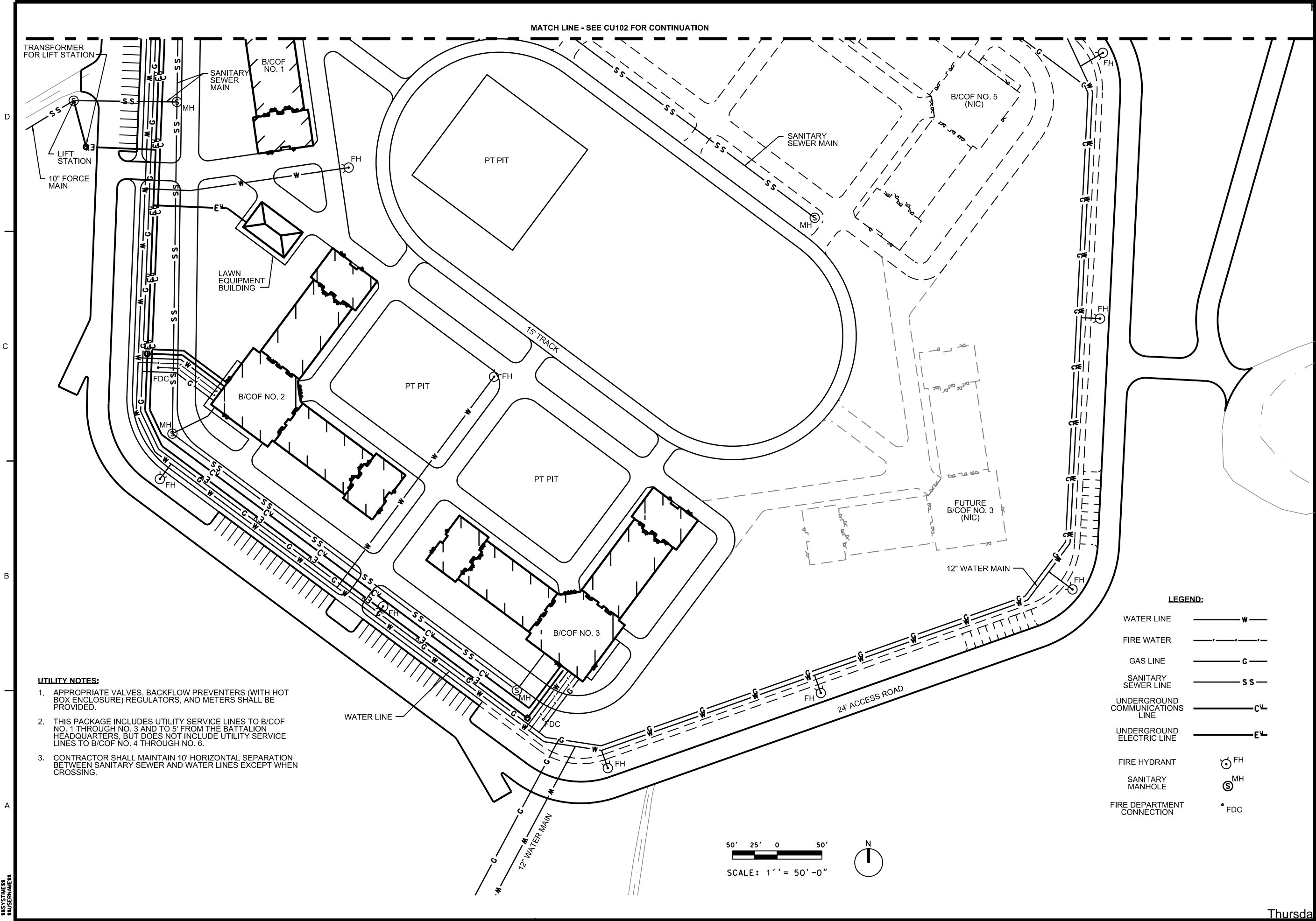
BASIC TRAINING COMPLEX III BARRACKS/ COMPANY OPERATIONS FACILITY (B/COF) FORT JACKSON, SOUTH CAROLINA
OVERALL GRADING PLAN

PLATE REFERENCE NUMBER
CG101
SHEET 25

Thursda May 27, 2010

1100NSPEC11
11SYTIME11
11USERAME11

1100NSPEC11
11SYTIME11
11USERAME11



- UTILITY NOTES:**
1. APPROPRIATE VALVES, BACKFLOW PREVENTERS (WITH HOT BOX ENCLOSURE) REGULATORS, AND METERS SHALL BE PROVIDED.
 2. THIS PACKAGE INCLUDES UTILITY SERVICE LINES TO B/COF NO. 1 THROUGH NO. 3 AND TO 5' FROM THE BATTALION HEADQUARTERS, BUT DOES NOT INCLUDE UTILITY SERVICE LINES TO B/COF NO. 4 THROUGH NO. 6.
 3. CONTRACTOR SHALL MAINTAIN 10' HORIZONTAL SEPARATION BETWEEN SANITARY SEWER AND WATER LINES EXCEPT WHEN CROSSING.

LEGEND:

- | | |
|---------------------------------|--------|
| WATER LINE | — W — |
| FIRE WATER | — FW — |
| GAS LINE | — G — |
| SANITARY SEWER LINE | — SS — |
| UNDERGROUND COMMUNICATIONS LINE | — CU — |
| UNDERGROUND ELECTRIC LINE | — EU — |
| FIRE HYDRANT | ⊙ FH |
| SANITARY MANHOLE | ⊙ MH |
| FIRE DEPARTMENT CONNECTION | • FDC |

50' 25' 0 50'
SCALE: 1" = 50'-0"



US ARMY CORPS OF ENGINEERS SAVANNAH	
DESIGNED BY: C. STEWART	DATE: 22 MARCH 2010
DWN BY: BAH	SOLICITATION NO.: SER-ABW-0145-RFP0005
SUBMITTED BY: I. SUEWANN	CONTRACT NO.:
FILE NAME:	CATEGORY CODE: 72145-01
SIZE: D	PLOT SCALE:
22x34"	22x34"
U. S. ARMY ENGINEER DISTRICT SAVANNAH DISTRICT	
BURNS & MCDONNELL 9400 WARD PARKWAY KANSAS CITY, MISSOURI	
BASIC TRAINING COMPLEX III BARRACKS/ COMPANY OPERATIONS FACILITY (B/COF) FORT JACKSON, SOUTH CAROLINA	
UTILITY PLAN 1 OF 2	
PLATE REFERENCE NUMBER CU101	

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$$$DGNSPEC$$$
$$$SYSTIME$$$
$$$USERNAME$$$

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NOTE:

1. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ACTUAL LOCATION.
2. SIZE OF NEW PIPE SHALL BE DESIGNED/DETERMINED BY D/B CONTRACTOR AND SHALL BE CLOSELY COORDINATED WITH PSUS.
3. THE WORK FROM BUT NOT INCLUDING THE DEEPEENED MANHOLE DOWNSTREAM (WEST) CONSISTS OF LOWERING APPROXIMATELY 350 LF OF 24" SEWER MAIN. THE NEED FOR AND THE DESIGN OF THIS WORK SHALL BE CLOSELY COORDINATED WITH PSUS.
4. THE GAS TIE-IN LOCATION AND ROUTING FROM THE TIE-IN LOCATION TO THE PROJECT SITE SHALL BE CLOSELY COORDINATED WITH THE DPW.
5. THE TIE-IN LOCATION OF THE COMMUNICATIONS DUCTBANK AND THE ROUTING TO THE PROJECT SITE SHALL BE CLOSELY COORDINATED WITH THE NEC AND THE DPW. SEE APPENDIX FF FOR BTC2 SITE COMMUNICATIONS DRAWING.

APPENDIX K Life Cycle Cost Analysis Fuel Cost Information

The following utility rates for this installation are provided for design:

Electrical:

Demand Charge- \$10.48 per kilowatt (non-Summer); \$14.97 per kilowatt (Summer: June - September)

Energy Charge- \$0.05196 per kilowatt-hour (non-Summer); \$0.07260 per kilowatt-hour

Blended Rate- \$0.083 per kilowatt-hour (blended annual energy and demand cost)

Natural Gas:

Commodity Charge Rate - \$5.71 per dekaTHERM

Water:

Commodity Charge Rate - \$2.07 per Kgal

Sewer:

Commodity Charge Rate - \$1.13 per Kgal

APPENDIX L

LEED Project Credit Guidance

LEED Project Credit Guidance

This spreadsheet indicates Army required credits, Army recommendations regarding preference and avoidance of individual credits, project-specific ranking of individual point preferences, discussion of Installation roles in support of individual credits, and issues that Government Project Delivery Teams (PDTs) need to be aware of relating to individual credits. The Resources section that follows provides references and resources that relate to LEED, including policy and legal requirements, design guides and documentation resources.

LEED 2.2 Credit Paragraph		Army Guidance: Required - Preferred - Avoid Project Preference Ranking: (1=most preferred, blank=no preference, X=preference not applicable to this credit, Rqd=required)		
	LEED Project Credit Guidance			
PAR	FEATURE			REMARKS
CATEGORY 1 - SUSTAINABLE SITES (14 POSSIBLE POINTS)				
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Related to compliance with 40 CFR 122.26 (Clean Water Act).
SS1	Site Selection		X	See paragraph LEED CREDITS COORDINATION for information relating to this credit.

SS2	Development Density & Community Connectivity - OPTION 1 DENSITY		X	Credit is determined by Installation's site selection. See paragraph LEED CREDITS COORDINATION for information relating to this credit.
	Development Density & Community Connectivity - OPTION 2 CONNECTIVITY		X	Credit is determined by Installation's site selection. See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS3	Brownfield Redevelopment		X	Credit is determined by Installation's site selection. See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS4.1	Alternative Transportation: Public Transportation Access		X	Credit is determined by Installation's site selection. See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	Pref		
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1			Requires provision of vehicles, which cannot be purchased with construction funds. Assume Government will not provide vehicles unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	Pref		
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3			Requires provision of vehicle refueling stations. Installation must support type of fuel and commit to maintaining/supporting refueling stations.
SS4.4	Alternative Transportation: Parking Capacity	Pref		
SS5.1	Site Development: Protect or Restore Habitat			
SS5.2	Site Development: Maximize Open Space	Pref		Assume AGMBC option for aggregated open space at another location on the installation is not available to the project unless indicated otherwise.
SS6.1	Stormwater Design: Quantity Control	Pref		Related to compliance with 40 CFR 122.26

				(Clean Water Act).
SS6.2	Stormwater Design: Quality Control			
SS7.1	Heat Island Effect: Non-Roof	Pref		
SS7.2	Heat Island Effect: Roof	Pref	1	Coordinate with nearby airfield requirements, which may preclude this credit.
SS8	Light Pollution Reduction	Pref		
CATEGORY 2 – WATER EFFICIENCY (5 POSSIBLE POINTS)				
WE1.1	Water Efficient Landscaping: Reduce by 50%	Pref		Project must include landscaping to be eligible for this credit.
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	Pref		Project must include landscaping to be eligible for this credit.
WE2	Innovative Wastewater Technologies - OPTION 1			
WE2	Innovative Wastewater Technologies - OPTION 2			
WE3.1	Water Use Reduction: 20% Reduction	Pref		
WE3.2	Water Use Reduction: 30% Reduction	Pref		
CATEGORY 3 – ENERGY AND ATMOSPHERE (17 POSSIBLE POINTS)				
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR2	Minimum Energy Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EA1	Optimize Energy Performance	Rqd	Rqd	Earning of LEED EA1 points as indicated in paragraph ENERGY CONSERVATION, as a minimum, is required. Note that LEED points calculation is based on energy cost reduction.
EA2.1	On-Site Renewable Energy			

EA3	Enhanced Commissioning			The Commissioning Authority may be provided through the Design-Build Contractor only if in accordance with USGBC Credit Interpretation Ruling (CIR) dated 9/15/06. Commissioning Authority activities begin during design phase and continue well beyond beneficial occupancy. Assume Government will not provide CxA post-occupancy activities unless indicated otherwise.
EA4	Enhanced Refrigerant Management			
EA5	Measurement & Verification			Credit relates to EPACT metering requirements. Provider and funding of post-occupancy activities must be coordinated. Assume Government will not provide post-occupancy activities unless indicated otherwise.
EA6	Green Power		X	Credit is determined by Installation's purchase of green power. See paragraph LEED CREDITS COORDINATION for information relating to this credit.
CATEGORY 4 – MATERIALS AND RESOURCES (13 POSSIBLE POINTS)				
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Installation provides collection service and outside receptacle needs coordination.
MR1.1	Building Reuse: Maintain 75% of Existing Walls, Floors & Roof			
MR1.2	Building Reuse: Maintain 95% of Existing Walls, Floors & Roof			
MR1.3	Building Reuse: Maintain 50% of Interior Non-Structural Elements			
MR2.1	Construction Waste Management: Divert 50% From Disposal	Pref	1	See paragraph CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT for project requirement.
MR2.2	Construction Waste Management: Divert 75% From Disposal	Pref		

MR3.1	Materials Reuse: 5%			
MR3.2	Materials Reuse: 10%			
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Pref		Relates directly to EPA CPG compliance. Federal regulation as well as Federal, DOD and Army policies require purchase of products that contribute to this credit.
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Pref		Relates directly to EPA CPG compliance.
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally			
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally			
MR6	Rapidly Renewable Materials			Relates directly to USDA FB4P biobased materials compliance.
MR7	Certified Wood	AVD	AVD	This credit yields no incremental value to the Army and should typically be avoided. The only instance in which this credit should be pursued is in the event there is VERY little wood throughout the project, so that this credit can be achieved for nominal, or no, cost premium.
CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY (15 POSSIBLE POINTS)				
EQPR1	Minimum IAQ Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Related to compliance with 10 CFR 434 (Federal Energy Code).
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Assume all buildings are smoke free unless indicated otherwise. Family housing, barracks and other lodging are facility types where smoking may be permitted in some cases. If Statement of Work indicates smoking is permitted in these types of facilities, the requirements of LEED-NC 2.2 Option 3 apply.
EQ1	Outdoor Air Delivery Monitoring			
EQ2	Increased Ventilation			May adversely effect ability to earn energy optimization credits.
EQ3.1	Construction IAQ Management Plan: During Construction	Pref		

EQ3.2	Construction IAQ Management Plan: Before Occupancy	Pref		Construction schedule must accommodate activities required for this credit.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	Pref		
EQ4.2	Low Emitting Materials: Paints & Coatings	Pref		
EQ4.3	Low Emitting Materials: Carpet Systems	Pref		
EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	Pref		
EQ5	Indoor Chemical & Pollutant Source Control	Pref		System requiring weekly cleaning to earn this credit is not a permitted option for Army projects.
EQ6.1	Controllability of Systems: Lighting			
EQ6.2	Controllability of Systems: Thermal Comfort			
EQ7.1	Thermal Comfort: Design			
EQ7.2	Thermal Comfort: Verification			Project must earn credit EQ7.1 to be eligible for this credit. Assume Government will not provide post-occupancy activities unless indicated otherwise.
EQ8.1	Daylight & Views: Daylight 75% of Spaces	Pref	1	Contractor should maximize the use of daylighting, along with photodimming sensors to maximize energy efficiencies in this facility. Contractor will take care not to inadvertently increase solar gain in the pursuit of free daylighting.
EQ8.2	Daylight & Views: Views for 90% of Spaces	Pref		
CATEGORY 6 – FACILITY DELIVERY PROCESS (5 POSSIBLE POINTS)				
IDc1.1	Innovation in Design			
IDc1.2	Innovation in Design			
IDc1.3	Innovation in Design			
IDc1.4	Innovation in Design			
IDc2	LEED Accredited Professional	Rqd	Rqd	LEED AP during design and construction is required.

Resources. Following are resources with web links, discussion of Federal and Army mandates and policies that relate to LEED, sources of design guidance and documentation tools to assist the PDT. Use of/compliance with documents indicated in this appendix is not required unless indicated in RFP. In the event of conflict between RFP and this appendix, RFP takes precedence.

Federal Mandates

EPA, *Environmentally Preferable Purchasing (EPP) Program* (EPA), available through URL: <http://www.epa.gov/oppt/epp/> . Resulting from Executive Order [EO] 13101 *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition* (White House, 14 September 1998), it establishes basic guidelines for EPP as well as forms the basis for Comprehensive Procurement Guidelines (see below).

Comprehensive Procurement Guidelines [CPG], www.epa.gov/cpg.

The EPA publishes the Comprehensive Procurement Guidelines (CPGs), found in 40 CFR 247, that provide a list of products that must contain recovered material. **This is required regardless of whether the LEED recycled content credit is pursued or not.** Recommendations for the percentages of recovered materials are published in a companion document titled the Recovered Materials Advisory Notice (RMAN). Additional products are added every 2-3 years. The CPGs currently include several commonly used construction products (such as concrete, floor tiles, and roofing materials) and landscaping products (such as site furnishings and landscaping timbers).

EPA requires that the purchase of products listed on the CPG contain at least the recycled content indicated in the CPG when practicable. For every project, designer must review the current CPG list and, unless designer determines that justification for non-use exists, ensure that the technical specifications require at least the recycled content indicated in the CPG. The following are considered adequate justifications for non-use:

- a. The product does not meet appropriate performance standards.
- b. The product is not available within a reasonable time frame.
- c. The product is not available competitively (from two or more sources).
- d. The product is only available at an unreasonable price (compared with a comparable non-recycled content product).

Applicable FAR provisions and clauses: FAR Part 23.4, *Use of Recovered Materials*, 52.223-4, *Recovered Material Certification*, 52.223-9, *Estimate of Percentage of Recovered Material Content for EPA-Designated Products*. Note that although EPA designated recycled content products contribute to the LEED recycled content credit, satisfying this requirement does not guarantee that the project will reach the cumulative total required to earn the LEED credit.

USDA Federal Biobased Products Preferred Procurement Program (FB4P)

<http://www.biobased.oce.usda.gov>

The USDA has a program similar to the EPA CPG, found in 7 CFR 2902, that provides a list of designated products that must contain bio-based material with recommendations for the percentages of bio-based content. The rules for use of designated products are the same as EPA CPG. Currently the only designated construction product is roof coatings, however additional products may be added. For every project, designer must review the current USDA designations for products applicable to the project and, if any are found, unless designer determines that justification for non-use exists, ensure that the technical specifications require at least the bio-based content indicated in the designation.

All Federal contracts that involve the use or purchase of USDA- designated products must specify that the associated procurement requirements be met and must include applicable FAR provisions and clauses (currently not yet published). Note that although USDA designated bio-based content products contribute to the LEED rapidly renewable materials credit, satisfying this requirement does not guarantee that the project will reach the cumulative total required to earn the LEED credit.

Army Policy and Mandates

ECB 2006-7R Army Standard for Urinals (09 AUG2006) www.hnd.usace.army.mil/techinfo "Publications", "Engineering and Construction Bulletins". Mandates waterless urinals beginning FY10.

United States Green Building Council/LEED

USGBC Website – <http://www.usgbc.org>

LEED-NC (New Construction) v.2.2 Rating System, October 2005 --
<https://www.usgbc.org/ShowFile.aspx?DocumentID=1095>

LEED-NC v.2.2 Registered Project Checklist --
https://www.usgbc.org/FileHandling/show_general_file.asp?DocumentID=1096

LEED-NC v.2.2 Reference Guide – Available by purchase from the USGBC at:
<http://www.usgbc.org/b2c/b2c/mainFS.jsp>

LEED Letter Templates – Use of LEED Letter Templates for projects not registered with USGBC is a copyright infringement and is not permitted. Samples of the templates are available for review only at: <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1447>. (Fully functional access to LEED On-Line is only available to projects registered with the USGBC.)

LEED Credit Interpretations (CIRs) – Available on the members only side of the USGBC website. Click 'My Account' from the USGBC main web page (log-in and look for CIRs under 'My Resources.'

LEED Application Guide for Multiple Buildings and On-Campus Building Projects
https://www.usgbc.org/FileHandling/show_general_file.asp?DocumentID=1097. Provides direction in applying LEED-NC v2.1 and v2.2 to projects in a campus or multi-building setting such as corporate campuses, college campuses, and government installations (i.e. there is one owner or common property management and control).

General Resources

Unified Facilities Guide Specifications (UFGS) www.wbdg.org/ccb

UFGS are non-proprietary guide specifications covering a broad range of products and systems and incorporating agency-specific guidance and many sustainability updates. They are used and maintained by USACE, NAVFAC, AFCEA and NASA.

UFGS are in the process of being updated to include Specifier notes relating to all current EPA CPG product designations, but this process is not complete yet. Designer **MUST** address EPA CPG requirements in specifications on a product-by-product basis.

UFGS 01 33 29 *LEED™ Documentation*. This section includes overview and documentation requirements plus credit-specific requirements.

UFGS 01 62 35 *Recycled/Recovered Materials*. This section addresses EPA CPG compliance requirements.

UFGS 02 42 00 *Construction and Demolition Waste Management*. For DB and DBB use. This section includes requirement for waste management plan, diversion requirements and reporting.

UFGS 23 08 00.00 10 *Commissioning of HVAC Systems*. This section includes qualifications, standards and documentation, also includes several test checklists. Because it is limited to HVAC only it **does not** by itself satisfy the LEED fundamental commissioning requirement. Commissioning of other LEED required systems and coordination of documentation associated with this additional commissioning must be addressed.

USACE LEED Credit Documentation Tools

LEED 2.2 Documentation Requirements and Submittals Checklist. USACE Spreadsheet is available at <http://en.sas.usace.army.mil> to fill in for project submittals.

Commissioning Plan Document for LEED Fundamental Commissioning USACE template available at <http://en.sas.usace.army.mil> to edit to create project-specific document.

Owners Project Requirements Document for LEED Fundamental Commissioning. USACE template available at <http://en.sas.usace.army.mil> for Design Agent/Owner to edit to create project-specific document. Completed document should be included in DB RFPs or provided to Design Team at start of design.

Basis of Design Document for LEED Fundamental Commissioning. USACE template available at <http://en.sas.usace.army.mil> for Designer of Record to edit to create project-specific document.

Owner's Project Requirements Document for LEED Fundamental Commissioning

Project: Basic Training (BT) Barracks Complex II- Barracks/Company Operations
Facility

Approved: _____
Name Owner's Representative Date

Name Design Agent's Representative Date

Overview and Instructions

The purpose of this document is to provide clear and concise documentation of the Owner's goals, expectations and requirements for commissioned systems, and shall be utilized throughout the project delivery and commissioning process to provide an informed baseline and focus for design development and for validating systems' energy and environmental performance.

The Owner's Project Requirements Document is a required document for LEED Version 3.0 EA Prerequisite 1, Fundamental Commissioning of the Building Energy Systems. It shall be completed by the Corps District/Design Agent based on coordination with the Installation/User/Proponent and shall be approved by the Installation/User/Proponent representative.

Use of this template is not required, nor are there any restrictions on editing of it. It is provided simply as a tool to assist project teams in meeting the documentation requirements for LEED Fundamental Commissioning. The intent of the Owner's Project Requirements Document, per the LEED v3.0 Reference Guide, is to detail the functional requirements of a project and the expectations of the building's use and operation as it relates to commissioned systems. This template contains the basic recommended components indicated in the LEED v3.0 Reference Guide. It should be adapted as needed to suit the project, remaining reflective of the LEED intent.

The Owner's Project Requirements Document should ideally be completed before the start of design and furnished to the design team. It must be completed prior to the approval of Contractor submittals of any commissioned equipment or systems to meet LEED requirements.

Updates to the Owner's Project Requirements Document throughout the course of project delivery shall be made by the Corps District/Design Agent based on decisions and agreements coordinated with and agreed to by the Installation/User/Proponent.

The Owner's Project Requirements Document shall be included in the project's LEED documentation file under EA PR1, Fundamental Commissioning of the Building Energy Systems.

Owner's Project Requirements Document for LEED Fundamental Commissioning

Table of Contents

1. Owner and User Requirements
 - Primary Purpose, Program and Use
 - Project History
 - Broad Goals
2. Environmental and Sustainability Goals
 - Energy Efficiency Goals
 - General
 - Siting
 - Building Façade
 - Building Fenestration
 - Building Envelope
 - Roof
 - Other
3. Indoor Environmental Quality Requirements
 - Intended Use
 - Occupancy Schedule
 - Accommodations for After-Hours Use
 - Lighting, Temperature, Humidity, Air Quality, Ventilation, Filtration
 - Acoustics
 - Occupant Ability to Adjust System Controls
 - Types of Lighting
4. Equipment and Systems Expectations
 - Space Heating
 - Ventilation
 - Air Conditioning
 - Refrigeration
 - HVAC Controls
 - Domestic Hot Water
 - Lighting Controls
 - Daylighting Controls
 - Emergency Power
 - Other
5. Building Occupant and O&M Personnel Requirements
 - Facility Operation
 - EMCS
 - Occupant Training and Orientation
 - O&M Staff Training and Orientation

TABLE 1

1. **Owner and User Requirements**

What is the primary purpose, program and use of this project? (example: office building with data center)

Training and living spaces for basic trainees. Company administration offices. These components are more fully described in Paragraph 3 of Section 01 10 00

Describe pertinent project history. (example: standard design development)

Current standard was developed for an entire battalion complex including barracks, office, classroom, dining and outdoor training spaces in 2000 with mandatory floor plans and site plans. Minor changes were made in 2005 and in 2006 it was revised to delete many mandatory features to reduce project cost. Barracks floor plan remains mandatory. All complexes are sized for one battalion.

Broad Goals

What are the broad goals relative to program needs?

To provide economical, standardized facilities that meet the basic functional needs of units.

What are the broad goals relative to future expansion?

No provision for future expansion is needed.

What are the broad goals relative to flexibility?

Open, flexible design for admin offices. Ability to subdivide sleeping bays to accommodate gender ratio variations.

What are the broad goals relative to quality of materials?

Trainee spaces receive very heavy use. Company level interior spaces are not plush, receive a good deal of muddy boot travel, and need to be easy to keep clean. Maximum durability within budget. __

What are the broad goals relative to construction costs?

Facility must meet budget.

What are the broad goals relative to operational costs?

Meet EPACT 05 (reduced water, energy consumption). Minimize operating costs as much as possible within first cost budget.

Other broad goals: *(Insert as applicable)*

To provide essentially the same functional facility at all locations (site-adapt) to the extent possible to facilitate unit mobility and to reduce repetitive design costs.

To reduce construction time to 18 months.

2. Environmental and Sustainability Goals

What are the project goals relative to sustainability and environmental issues? (example: LEED Silver rating)

LEED Silver rating

What are the project goals relative to energy efficiency? (example: Meet EPACT)

Meet EPACT 05

What are the project goals and requirements for building siting that will impact energy use?

Same facility must be site-adapted nationwide. Consistent building orientation cannot be expected.

Variations in availability of fuel sources.

Special local requirements are indicated in Paragraph 6 of Section 01 10 00.

What are the project goals and requirements for building facade that will impact energy use?

Same facility must be site-adapted nationwide. Exterior appearance will vary to be compatible with adjoining environment's architectural theme.

Special local requirements are indicated in Paragraph 6 of Section 01 10 00.

What are the project goals and requirements for building fenestration that will impact energy use?

Same facility must be site-adapted nationwide. Fenestration will vary to be compatible with adjoining environment's architectural theme. Consistent building orientation cannot be expected.

Antiterrorism/Force Protection criteria (UFC 4-010-01) requires laminated glass and heavy duty frame.

What are the project goals and requirements for building envelope that will impact energy use?

ASHRAE 90.1 and EPACT are required. Antiterrorism/Force Protection criteria (UFC 4-010-01) requires hardened structure at Covered Training.

Special local requirements are indicated in Paragraph 6 of Section 01 10 00.

What are the project goals and requirements for building roof that will impact energy use?

Special local requirements are indicated in Paragraph 6 of Section 01 10 00.

Other: *(Insert as applicable)*

3. Indoor Environmental Quality Requirements

What is the intended use for all spaces? For all spaces that have an intended use that is not readily apparent from the space name, provide this information in Table 1.

What is the anticipated occupancy schedule (numbers of occupants and time frames) for all occupied spaces? Indicate the default occupancy schedule below and for all spaces that have an occupancy schedule that differs from the default, provide this information in Table 1.

Trainee daily schedule is as indicated in Section 01 10 00 Functional Requirements. Company office may have sporadic after-hours use.

What accommodations for after-hours use are required? (example: access control, lighting controls, HVAC controls) Indicate general accommodations required below and for all spaces that have special requirements, provide this information in Table 1.

Supervised monitoring of building. IDS at arms vault. Lights manually controlled in barracks areas. Office areas have automatic lighting controls with manual override as necessary.

What are the lighting, temperature, humidity, air quality, ventilation and filtration requirements for all spaces? Indicate the default requirements below and for all spaces that have a requirement that differs from the default, provide this information in Table 1.

Lighting: IESNA Lighting Handbook, IESNA RP-1-04, ASHRAE 90.1 (ASHRAE 90.1 does not apply to residential)

Temperature: See Table 5-1 in Section 01 10 00 of RFP

Humidity: 50%

Air Quality: ASHRAE 62.1

Ventilation: ASHRAE 62.1

Filtration: _____

What are the acoustical requirements for all spaces? Indicate the default acoustical requirements below and for all spaces that have a requirement that differs from the default, provide this information in Table 1.

As indicated in Section 01 10 00 of RFP

What is the desired level of occupant ability to adjust systems controls? Indicate the default desired levels below and for all spaces that have a desired level that differs from the default, provide this information in Table 1.

Lighting: On/off control in sleeping bays. Automatic controls elsewhere. Dimming as indicated in Section 01 10 00 of RFP

Temperature: No occupant adjustment

Humidity: No occupant adjustment

Air Quality: No occupant adjustment

Ventilation: No occupant adjustment

What, if any, specific types of lighting are desired? (example: fluorescent in 2x2 grid, accent lighting, particular lamps)

None

4. Equipment and System Expectations

(Complete for each category as applicable or indicate "none identified" or "N/A". Add desired features information for other anticipated commissioned systems as applicable)

Indicate desired features for the following commissioned system: Space Heating

Desired Type: None Identified

Quality: _____

Preferred Manufacturer: N/A

Reliability: _____

Automation: Automatically controlled through Building Automation System (BAS)

Flexibility: Total building heating load split between two boilers if a central system is utilized__

Maintenance Requirements: _____

Efficiency Target: Comply with ASHRAE 90.1

Desired Technologies: _____

Indicate desired features for the following commissioned system: Ventilation

Desired Type: None identified

Quality: Comply with ASHRAE 62.1

Preferred Manufacturer: N/A

Reliability: _____

Automation: Automatically controlled through Building Automation System (BAS)

Flexibility: _____

Maintenance Requirements: _____

Efficiency Target: _____

Desired Technologies: Energy Recovery

Indicate desired features for the following commissioned system: Air Conditioning

Desired Type: None identified

Quality: _____

Preferred Manufacturer: N/A

Reliability: _____

Automation: Automatically controlled through Building Automation System (BAS)

Flexibility: See Section 01 10 00 regarding split bays

Maintenance Requirements: _____

Efficiency Target: Comply with ASHRAE 90.1

Desired Technologies: Economizer cycle

Indicate desired features for the following commissioned system: Refrigeration

Desired Type: None identified

Quality: _____

Preferred Manufacturer: _____

Reliability: Total building cooling load split between two units if a central system is utilized

Automation: Automatically controlled through Building Automation System (BAS)

Flexibility: _____

Maintenance Requirements: _____

Efficiency Target: Comply with ASHRAE 90.1

Desired Technologies:

Indicate desired features for the following commissioned system: HVAC Controls

Desired Type: LonWorks Technology

Quality: _____

Preferred Manufacturer: _____

Reliability: _____

Automation: _____

Flexibility: _____

Maintenance Requirements: _____

Efficiency Target: _____

Desired Technologies: _____

Indicate desired features for the following commissioned system: Domestic Hot Water

Desired Type: None identified

Quality: _____

Preferred Manufacturer: _____

Reliability: _____

Automation: Standard Manufacturer's Controls, Return Water Recirculation

Flexibility: _____

Maintenance Requirements: _____

Efficiency Target: Compliant with ASHRAE 90.1

Desired Technologies: _____

Indicate desired features for the following commissioned system: Lighting Controls

Desired Type: As indicated in Section 01 10 00

Quality: _____

Preferred Manufacturer: _____

Reliability: _____

Automation: _____

Flexibility: _____

Maintenance Requirements: _____

Desired Technologies: As indicated in Section 01 10 00

Indicate desired features for the following commissioned system: Daylighting Controls

Desired Type: Not required

Quality: _____

Preferred Manufacturer: _____

Reliability: _____

Automation: _____

Flexibility: _____

Maintenance Requirements: _____

Efficiency Target: _____

Desired Technologies: _____

Indicate desired features for the following commissioned system: Emergency Power

Desired Type: Not required

Quality: _____

Preferred Manufacturer: _____
Reliability: _____
Automation: _____
Flexibility: _____
Maintenance Requirements: _____
Efficiency Target: _____
Desired Technologies: _____

Indicate desired features for the following commissioned system: Other - Plumbing

Desired Type: _____
Quality: _____
Preferred Manufacturer: _____
Reliability: _____
Automation: _____
Flexibility: Tempering valves to handle wide demand fluctuations.
Maintenance Requirements: _____
Efficiency Target: _____
Desired Technologies: _____

5. Building Occupant and O&M Personnel Requirements

How will the facility be operated? Who will operate the facility? By DPW contractor.

Will the facility be connected to an EMCS? If so, what are the interface requirements? (example: monitoring points, control points, scheduling) As indicated in Section 01 10 00

What is the desired level of training and orientation for building occupants to understand and use the building systems? Minimal for occupants

What is the desired level of training and orientation for O&M staff to understand and maintain the building systems? As indicated in Section 01 78 02.00 10.

APPENDIX N

LEED Requirements for Multiple Contractor Combined Projects



LEED-NC

Build green. Everyone profits.TM

LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC)

**For use with the LEED-NC Green
Building Rating System
Versions 2.1 and 2.2**

October 2005

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Introduction

The purpose of this Application Guide is to provide direction in applying the Leadership in Energy and Environmental Design® Green Building Rating System Versions 2.1 and 2.2 for New Construction and Major Renovations (LEED-NC) to projects in a campus or multi-building setting such as corporate campuses, college campuses, and government installations (i.e. there is one owner or common property management and control). The application guide is intended for projects where several buildings are constructed at once, in phases, or a single building is constructed in a setting of existing buildings with common ownership or planning with the ability to share amenities or common design features. Throughout this guide, the term “campus” is used to represent all of these permutations.

LEED-NC Rating System, Support Materials and Tools

LEED is a program of the U.S. Green Building Council (USGBC) that establishes performance goals in five environmental categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. In addition, a sixth category, Innovation & Design Process, addresses those environmental issues not included in the environmental categories such as acoustics, community enhancement, education, and expertise in sustainable design. Many issues specific to campus projects that are not addressed by the existing credit structure may be included in the Innovation & Design Process category.

The rating system is supported by the LEED-NC Reference Guide, a document that provides additional information and guidance for each LEED Prerequisite and Credit. Consult the LEED-NC Rating System, Reference Guide and www.usgbc.org for more information on the LEED program, the LEED application process, and the USGBC.

Working in concert with the rating system and reference guide, the LEED-NC Submittal Template is a helpful tracking and documentation tool, as well as a required submittal for LEED certification. The Version 2.0 Calculator spreadsheets still remain helpful for some credits.

LEED-NC Application Guide for Multiple Buildings and On-Campus Projects

This Application Guide facilitates using LEED-NC as a performance standard for greening the design of a building or set of buildings within a campus setting (college, corporate, military, multi-use development, etc.), or a group of buildings certifying as a set. A project involving several buildings may be built all at once, or in phases. The latter is especially applicable to large developments.

The Application Guide provides an opportunity for building owners to reduce the environmental impact of buildings by approaching green building in a broader context. Opportunities for reducing environmental impact may be spread over several buildings, a complex of buildings, or an entire campus or installation. Credits are available to each building that benefits from the shared amenities. This approach allows for economies of

scale, enabling more opportunities to reduce the environmental impact of buildings and infrastructure.

The Application Guide analyzes the intent of each LEED-NC credit and prerequisite as developed for commercial facilities and interprets them for campus and installation projects. The greatest opportunities for new interpretations arise in credits associated with Sustainable Sites, Water Efficiency, and Energy and Atmosphere. Materials and Resources and Indoor Environmental Quality credits have fewer campus-specific interpretations and remain mostly the same as LEED-NC, merely requiring aggregation of performance results. The total points available under this guide are the same as LEED-NC v2.1 and 2.2 with no new credits added to or deleted from the basic rating system.

This application guide interprets and supplements the LEED criteria for projects. Where appropriate and unique to the campus or multiple building environment, alternative campus requirements and submittals that meet the intent of the basic rating system are provided. The LEED-NC Rating System and the Reference Guide are the governing documents for all LEED certification applications.

The LEED Multiple Buildings and Campus Committee

The LEED Steering Committee instructed the Multiple Buildings and Campus Committee to create an application guide that would be a simple overlay onto LEED-NC. Although simple in concept, this guide will assist many LEED projects – e.g. at the time of release, approximately 7% of all LEED registered project square footage is that of higher education facilities, which is just one of the sectors served by the guide. The MB&C Committee’s ultimate desire is a LEED rating system that can be used to certify entire campuses and military installations in order to more thoroughly impact these market sectors.

USGBC gratefully acknowledges the following committee members (past and present) for their contributions to this document.

Don Fournier (Chair)	University of Illinois Building Research Council
Mark Maves (Vice Chair)	SmithGroup, Inc
Mike Chapman	Naval Facilities Engineering Command
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Amanda Eichel	formerly of the University of California
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Melissa Solberg	formerly of Ford Land Development Corporation
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Overview

How to Use the Application Guide

This Application Guide is designed to complement the LEED-NC Green Building Rating System and the LEED-NC Reference Guide. The prerequisites and credits are supplemented, where necessary, by alternative Requirements and Submittals in order to apply the rating system to on-campus projects and multiple-build projects. *Credit requirement alternatives in this Application Guide may be used instead of the regular LEED-NC requirements, but are not mandatory as they may not apply in all situations.* The USGBC's CIR process also applies to this Application Guide and its requirements.

If appropriate, each prerequisite or credit includes Application Guidance with a discussion of related technologies and strategies. The Application Guide should be used as a working document that is referenced frequently throughout the design process.

Campus and Multiple Building Issues

The most detailed application guidance is necessary in the Sites category, as it presents the most challenges. Most credits in other categories simply allow the option of aggregate calculations. Campus settings sometimes have established property lines between segments of the campus, but share a common infrastructure between areas. Street lighting within a campus (e.g., lighted walkways) may technically encroach upon an adjacent property within the campus boundary. Similarly, stormwater from the campus may enter into a common retention pond or treatment facility specifically built for the campus. The use of natural treatment processes and distributed approaches are encouraged in the campus setting. The campus may own a wastewater treatment system and utilize the gray water for irrigation purposes. Streets and right of ways may be turned over to the local government after completion. Infrastructure and common amenities can be shared in campus settings and may contribute to performance achievement, thus helping to capture LEED points. The approach must be consistently applied across the project and all such cases are carefully scrutinized by the USGBC.

Some campus and multiple building projects may be mixed use development where the campus is developing a portion of the project and a separate party (or parties) is developing the remainder of the project. In such cases, the campus entity may define the LEED scope in such a way as to omit buildings that will be built by a separate party. This choice should be made with due consideration of the issues and projects are advised to keep omissions within the site boundaries to reasonable limits, in particular to parts of the overall project over which the project team will not have control. When the project is one building, the parts of the building within the campus entity's scope must meet LEED requirements. It is recommended that these buildings demonstrate that specific steps have been taken and guidance provided to insure that future build-out can also meet LEED requirements. The development of a thorough and instructive set of design guidelines and recommendations, coupled with building infrastructure to

support future LEED build-outs, is encouraged to ensure that the building will perform as a LEED building after build-out.

The Certification Process for Multiple Buildings and within Campus Settings

Any project team utilizing this guide simply registers its project under the standard LEED-NC program. A project already registered can choose to use the application guide at any time before certification submittal, but should do so as early as possible during the pre-design or design stage.

*** **Note:** The following certification processes are in pilot phase, and may be revised at any time. The most up-to-date version will be posted on the Web site along with this application guide. ***

There are three approaches to certifying buildings in the campus or installation setting:

- Certifying a new building within a setting of existing buildings that are considered a campus, i.e. there is one owner or common property management and control.
- Certifying a group of new buildings as a package where the entire building set will be rated as a package and only one rating received. These buildings may constitute the entire campus or be a subset of an existing campus.
- Certifying new buildings where each new building is constructed to a set of standards but will receive an independent rating based on achievement of credits beyond the standards specific to that building. These buildings may constitute the entire campus or be a subset of an existing campus.

Each of these approaches will be discussed separately and registration and certification provided for that particular approach.

Certifying a new building within a setting of existing buildings

The certification process is essentially the same as the LEED-NC certification process for the given building. When certifying a single building under the Application Guide, you may choose campus requirements and submittals in lieu of the standard LEED-NC requirements and submittals where unique aspects of the campus setting have an impact on the credit affecting the building, e.g. where stormwater management practices are campus-wide rather than building-specific.

A reasonable and logical “LEED project site” boundary must be defined for LEED purposes. The project scope of work and the site area affected by the construction generally suffice to inform this definition. The defined site must remain consistent for all LEED credits. The Application Guide provides details on special considerations for shared amenities such as parking (adjacent and, more often, remote) and open space.

Certifying a group of new buildings as a package where the entire building set will be rated as a package and only one rating received

For entities that construct a set of buildings at once or over a defined time period in a campus setting, certification of each building individually could result in excessive documentation, much of which would be duplicated between buildings. In this case the option of rating the entire building set may be the best choice. When certifying a set of buildings under the Application Guide, you may choose campus requirements and submittals in lieu of the standard LEED-NC requirements and submittals where unique aspects of the campus setting impact the credit affecting the buildings. The Application Guide provides the methods for calculations and submittals for credits that may be averaged across the set of buildings and defines which credits must be met by each individual building. Using the averaging techniques, where applicable, allows for one rating to be applied to the building set, thereby minimizing documentation. Identify the group of buildings with a single name for LEED registration and certification.

Certifying new buildings where each new building is constructed to a set of standards but will receive an independent rating based on achievement of credits beyond the standards

1. Many campus build entities establish design standards (e.g. campus master plans and specifications) that will be applied repeatedly to new buildings. These elements may be site- or building-specific. The campus build process allows applicants to certify a “prototype” credit set that is intended for repetition on subsequent projects. The total credits beyond the standards may vary from building to building. Project teams will be permitted to designate prerequisites as prototypes.

2. Certification Review for the First Project:

- a. USGBC shall conduct a thorough and complete review of the first project, including prototype credits.
- b. The certification submittal shall include all supporting background information for prototype prerequisites/credits, and specific guidance will be developed for these requirements (similar to that created for LEED-NC audits).
- c. Projects will receive a Preliminary and Final LEED Review for all prerequisites/credits pursued, following the published review process.
- d. The Appeal process shall be an option for any prerequisite/credit which is part of this first project.

- e. All approved prototype prerequisites/credits will be designated as such in the Final or Appeal LEED Review of this first project. Any denied prototype prerequisite/credit shall not be included in the prototype set.

3. Certification Reviews For Subsequent Project(s):

- a. Subsequent projects shall be reviewed per the current process, which includes up to six prerequisites/credits selected for audit. It will be at the discretion of the review team whether or not a prototype credit will be selected as one of the up to six for audit.
- b. These projects will not be required to submit documentation on approved prototype prerequisites/credits unless selected for audit in the Preliminary LEED Review.
- c. Failure of an audited prototype prerequisites or credit will result in that item being denied in the current review. The denied item will temporarily drop out of the set of approved prototype prerequisites/credits as the project team will be required to demonstrate achievement of this specific item for the next three consecutive project application reviews. Once achievement is demonstrated, this item will return to the prototype set. If achievement is NOT demonstrated in any one of the next three consecutive project application reviews, the item shall be permanently removed from the prototype set.
- d. Appeals will not be permitted for prototype prerequisites/credits in subsequent projects.
- e. Prerequisites/credits may be dropped from the approved set of prototype prerequisites/credits at the project team's discretion. Once removed from the set, this item shall not be reviewed as a prototype prerequisite/credit unless it is re-established as such by demonstrating achievement of this specific item for three consecutive project application reviews, or per the steps outlined in #2 above.
- f. Prerequisites/credits may be added to the approved set of prototype prerequisites/credits at the project team's discretion. It must be established as such by demonstrating achievement of this specific item for three consecutive project application reviews or per the steps outlined in #2 above (for the latter, this action shall occur with an individual project application, and a fee will be associated with adding this item to the prototype set).

The process above assumes that all buildings will be constructed to a specific standard and that credits associated with that standard can receive preliminary approval. Within the campus setting, the situation can arise where certain site-related amenities would

not be constructed until after the building project is complete. This may result in some pending credits for buildings. These pending credits cannot be awarded until the actual master plan is put into effect and the shared amenities constructed. The individual projects have two choices:

1. Complete certification of the project with certain credits “pending.” These pending credits may alter the rating of the project. If the project is rated without the pending credits, its rating will be based on only those credits achieved. Once the pending credits are available, the project can be recertified and the credits awarded at that time.
2. Await certification until all credits are available.

The volume/campus build process can also be a useful tool for developers to use when managing a portfolio of buildings. Tracking site-specific issues and benefits of individual credits or strategies and the lessons learned during the process will inform future design revisions and decisions. Whether building and certifying projects one at a time, or as a package of several buildings, project teams must be fair and reasonable in defining the project scope and site boundaries and be consistent across credit calculations.

Summary of Prerequisites and Credits

Sustainable Sites	14 Possible Points
Prerequisite 1: Erosion and Sedimentation Control	Required
Credit 1: Site Selection	1
Credit 2: Urban Redevelopment	1
Credit 3: Brownfield Redevelopment	1
Credit 4: Alternative Transportation	4
Credit 5: Reduced Site Disturbance	2
Credit 6: Stormwater Management	2
Credit 7: Reduced Heat Island Effect	2
Credit 8: Light Pollution Reduction	1
Water Efficiency	5 Possible Points
Credit 1: Water Efficient Landscaping	2
Credit 2: Innovative Wastewater Technologies	1
Credit 3: Water Use Reduction	2
Energy and Atmosphere	17 Possible Points
Prerequisite 1: Fundamental Building Systems Commissioning	Required
Prerequisite 2: Minimum Energy Performance	Required
Prerequisite 3: CFC Reduction in HVAC&R Equipment	Required
Credit 1: Optimize Energy Performance	10
Credit 2: Renewable Energy	3
Credit 3: Additional Commissioning	1
Credit 4: Ozone Protection	1
Credit 5: Measurement and Verification	1
Credit 6: Green Power	1
Materials and Resources	13 Possible Points
Prerequisite: Storage and Collection of Recyclables	Required
Credit 1: Building Reuse	3
Credit 2: Construction Waste Management	2
Credit 3: Resource Reuse	2
Credit 4: Recycled Content	2
Credit 5: Local/Regional Materials	2
Credit 6: Rapidly Renewable Materials	1
Credit 7: Certified Wood	1

Indoor Environmental Quality		15 Possible Points
Prerequisite 1: Minimum IAQ Performance		Required
Prerequisite 2: Environmental Tobacco Smoke (ETS) Control		Required
Credit 1: Carbon Dioxide (CO2) Monitoring		1
Credit 2: Ventilation Efficiency		1
Credit 3: Construction IAQ Management Plan		2
Credit 4: Low-Emitting Materials		4
Credit 5: Indoor Chemical and Pollutant Source Control	I	1
Credit 6: Controllability of Systems		2
Credit 7: Thermal Comfort		2
Credit 8: Daylighting and Views		2
Innovation and Accredited Professional Points		5 Possible Points
Credit 1: Innovations in Design		4
Credit 2: LEED Existing Building Accredited Professional		1
TOTAL POINTS AVAILABLE		69

SUSTAINABLE SITES

SS Prerequisite 1: Erosion & Sedimentation Control

Application Guidance

When the site incorporates more than one building, consider the phasing of construction and how the control plan will be modified over time to achieve the requirements. Site disturbance may also be phased and erosion control techniques applied at appropriate times. For large sites, this may be required by law, so effective planning at this scale is highly recommended.

SS Credit 1: Site Selection

Application Guidance

The requirements of this credit are very specific to the project site; substitution of other parcels to meet these requirements is not allowed. Selection of a site for multiple buildings—especially one that is developed over a long period of time—will require effective site layout and planning to be sure all buildings will be able to meet the requirements.

If the site of a multiple-building development does not fully comply with credit requirements, then the buildings can not achieve the credit under a single group certification. However, in such a situation, an individual building is still eligible for the credit if it can be demonstrated that:

1. the area disturbed by the building's construction activity complies with credit requirements and this is demonstrated within the LEED application submittal. This approach is expected to be most useful when buildings are being constructed at different times; OR
2. credit requirements are met for the area defined by a reasonable "LEED project site boundary" that corresponds to the buildings' development footprints or other fair subdivision method. The LEED application submittal must include thorough justification for this artificial site boundary, as it will be closely scrutinized. The LEED project boundary must remain consistent for all credits. This approach is expected to be most useful when buildings are constructed within the same or overlapping time frames.

SS Credit 2: Development Density & Community Connectivity

Application Guidance

NC Version 2.2 provides a “community connectivity” option that is most likely preferable for most campus and non-urban settings. Version 2.1 guidance reflects interpretations that provide compliance pathways adjusted for campus settings.

For Version 2.2, Option 2 (Community Connectivity):

Single buildings on a campus and each building within multiple building projects must comply with the credit requirements as written in order to achieve the compliance path.

For Version 2.1 (and Version 2.2 Option 1):

Requirements

- a) Show that the project complies with the Version 2.1 credit requirements as written and incorporating the concepts in the “supplemental application guidance” section, below.

OR

- b) If the site is located in an existing urban area and the contiguous property is over 15 acres the project may use the campus boundaries in lieu of a documentation circle to calculate density.

OR

- c) Show that the project complies with a regional or campus master planning effort to redevelop an area with existing infrastructure into a higher density area with an ultimate intended density that reflects desired local development conditions and meets the intent of this credit.

Submittals for (c)

To document that the project has achieved credit equivalence, provide the following information in addition to the Submittal Template:

- Documentation showing that the project is being located in a previously developed area with existing development and infrastructure. (New development in a greenfield would not be considered appropriate in this case.) Provide information about the existing development density based on either the documentation circle or the property boundaries.
- Documentation verifying that the project location is within a designated dense urban or campus growth area.

- Documentation that the project is resulting in increased development density that meets or contributes to the goals of the urban development plan or campus master plan.

Supplementary Application Guidance

Typical programmatic requirements for a campus or installation can include common green spaces, land used for agriculture, and outdoor recreation spaces (except sport stadiums). These will all decrease average density when included in the calculations, yet they provide important functions and quality-of-life to a campus. Therefore, these types of required, programmed, low-density outdoor land uses may be considered added to the list of exceptions on page 21, step 5 of the LEED-NC v2.1 Reference Guide, along with "undeveloped public areas such as parks and water bodies."

Using the campus boundary for density calculations (if the campus is at least 15 acres) is beneficial because it does not penalize existing rural or suburban institutions for their neighbors' lower development density, nor does it benefit urban campuses for their neighbors' higher density. The stipulation of 15 acres was chosen because it generally indicates a sizable campus that is deemed to have a substantial enough impact to serve the credit's intent. Using this method also reduces some of the burden of documentation compared to original requirements. Once it is completed for one campus project it is simply updated for the next one, rather than defining a new boundary circle each time and researching additional buildings within a slightly different radius.

A new building is best located where shared physical and intellectual resources exist. Locating it next to an area with a higher density just to promote density rather than where it rationally belongs is not reasonable and it may create negative impacts for transportation and other community aspects. The credit's intent is well served by encouraging campuses to increase their on-campus density (even if existing density is not quite 60,000sf/acre). This approach might also encourage better master planning of building-to-infrastructure relationships on campus.

The LEED-NC v2.1 Reference Guide (page 20) says "Work with local jurisdictions and follow the urban development plan to meet or exceed density goals." Many university campuses and government installations are not required to follow local jurisdictions in this regard and should therefore establish their own density goals that meet the intent of this credit.

SS Credit 3: Brownfield Redevelopment

Application Guidance

Large brownfield site redevelopments may vary in the amount of remediation required for specific buildings under consideration. As long as the entire site is considered a brownfield, credit may be given to buildings on portions of that site that are contaminant free and require no specific remediation for their development footprint.

SS Credit 4.1: Alternative Transportation - Public Transportation Access

Application Guidance

Work with the transit authority to re-engineer bus routes and stops to service the site so that each building is within the required proximity. Consider establishing transit corridors and zones within the campus to ensure availability and access for the entire campus. Either public or campus bus lines must be in place by the end of construction to receive credit on that basis. Campus bus lines must interface with public mass transit. If there is no local mass transit, the campus bus line must connect with a commercial bus or rail line.

For rail transit systems that have not yet been constructed, a letter from the transit authority (stating the intent to establish the rail station and confirming funding sources) is sufficient to qualify for the credit. Campus shuttles to the closest operational station (if local) can be an interim solution until a new, closer station is in full operation.

SS Credit 4.2: Alternative Transportation - Bicycle Storage & Changing Rooms

Application Guidance

The requirements are applicable to each building in a multiple-build project. When calculating the bicycle rack capacity for transients in a non-residential building, address the loading possible at one time and not the cumulative loading based on the total transients in a day. Locate the bicycle storage facilities within 50 feet of the frequently used entrances. Transient (e.g. students, in the case of a campus building) occupancy is required to be included when calculating bicycle storage capacity.

Full-time staff (or staff FTE) may be used to calculate shower/changing room requirements. For this calculation, transients are to be defined as visitors to the building for less than 7 hours. Establish overlapping zones within the campus for ready access to shower and changing facilities.

If the project(s) is a mixed used development including residential buildings and other types of buildings, such as barracks complex on a military installation or a residential section of a campus, each building needs to meet the bicycle storage requirements based on its usage and occupancy.

A project is exempt from the shower facility requirement if all non-transient building occupants are housed on the same campus as that building (i.e. a military installation), or within a ½ mile of the building(s).

SS Credit 4.3: Alternative Transportation - Alternative Fuel, Low Emission and Fuel-Efficient Vehicles

Application Guidance

Requirements

Provide alternative fuel vehicles (ultra low sulfur diesel, CNG, LNG, electric, fuel cell, E85; or use average B50 biodiesel in standard diesel engine), low-emission and/or fuel efficient vehicles* for 3% of the full time employees (FTE) in the building(s) AND provide preferred parking for these vehicles, AND have access to a nearby alternative fueling station.

OR

Where the campus has a central fleet operation or motor pool, at least 50% of the vehicles available must be alternative fuel vehicles (as defined above).

Bi-fuel vehicles must utilize the alternative fuel option.

In the case of centralized parking, accommodations for alternative-fueled vehicles may be made at the central facilities, providing that those accommodations are credited cumulatively to each building's need based on the preceding criteria. The centralized parking must be within ¼ mile of the building(s) or serviced by a campus shuttle.

** Low-emission and fuel-efficient vehicles are defined as vehicles that are either classified as Zero Emission Vehicles (ZEV) by the California Air Resources Board or have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide.*

Submittals

Provide a LEED Submittal Template and (back-up documentation that proves faculty/staff/students/employees/residents own vehicles via the preferred parking incentive program), a map identifying the location(s) of the alternative fueling facility, and for campus/installation fleet vehicles provide proof of ownership of, or 2 year lease agreement for, alternative fuel vehicles and calculations indicating that alternative fuel vehicles will serve 3% of

building occupants. Provide site drawings or parking plan highlighting preferred parking or alternative fuel vehicles.

OR

Provide a LEED Submittal Template with specifications and site drawings highlighting alternative refueling stations. Provide calculations demonstrating that these facilities accommodate 3% or more of the total vehicle parking capacity. If centralized parking is used, provide documentation that the parking meets the requirements for distance or shuttle service.

Supplementary Application Guidance

The campus environment lends itself very well to centralized parking concepts which may more readily accommodate preferred parking. A centralized alternative fueling area may be a viable alternative in the case of flexible fuel vehicles. Fleet purchases and/or fuel choices (e.g. biodiesel) may be strategically combined to achieve the performance target. Consider incentive programs for faculty/staff/students.

SS Credit 4.4: Alternative Transportation - Parking Capacity

Application Guidance

Campuses are often exempt from local zoning laws regarding parking, and thus determine their own standards. Calculation and documentation for this credit may be done either on a project by project basis or a campus-wide basis.

Requirements

If applicable local zoning code indicates there are no minimum parking capacity requirements, or if the campus entity is exempt from local codes, size the parking capacity in transit-oriented developments (TOD's) according to the minimum requirements by building typology as outlined in the Portland, Oregon Title 33 Planning and Zoning -Chapter 33.266 for Parking and Loading, Table 266-1 and 266-2 (at

http://www.planning.ci.portland.or.us/zoning/ZCTest/200/266_parking.pdf) AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants,

OR

For rehabilitation projects add no new parking and reduce the capacity of existing oversized parking AND provide preferred parking for carpools or vanpools capable of serving 5% of the building occupants.

Accommodations for carpools and vanpools may be made at the central parking facilities, providing that they are credited to only one building or project based on the preceding criteria. The centralized parking should be within ¼ mile of the building(s) served or be serviced by a shuttle bus.

Supplementary Application Guidance

The campus environment lends itself very well to centralized parking concepts which may more readily accommodate preferred parking. An alternative method of establishing parking requirements have been provided. It is suggested that the method that generates the least parking be utilized. Long term master planning of campus parking facilities is recommended. A successful application of demographic analysis of parking facility users will help identify where parking will work best to serve mixed uses. An example is to locate parking garages where they can effectively be used by at least two groups or shifts per day, rather than a garage dedicated to just an 8am-5pm work force

When calculating the carpool space requirement on a campus where no parking is permitted within the specific project boundary, it is permissible to meet this credit by providing carpool spaces outside of the project boundary to serve the 5% of building occupants. These spaces must not be counted toward other LEED projects. Signage restricting carpool parking only to this project's occupants is not necessary. The "preferred" parking requirement is satisfied if a campus shuttle bus route serves satellite parking lots and structures. Calculation and documentation for this credit may also be achieved on a campus-wide basis. When using the campus-wide approach:

- If all parking spaces are permitted and designated as residential and commuter, the number of commuter permits may be used as the basis of calculations for carpool spaces.
- The credit can be achieved by proxy if local jurisdictional requirements that exceed the credit requirements and it is clearly demonstrated in the LEED submittal.
- Comprehensive transportation management programs are eligible for an innovation point.

Regardless of the compliance approach utilized, it is necessary to sufficiently promote the carpool program.

SS Credit 5.1

Version 2.1: Reduced Site Disturbance - Protect or Restore Open Space

Version 2.2: Site Development - Protect or Restore Habitat

Application Guidance

Submittals

- For greenfield sites, provide the LEED Submittal Template and attach a list of buildings indicating that each has met requirements.
- For previously developed sites where there are multiple buildings in the project scope, enter aggregate data in the Submittal Template, as appropriate.

Supplementary Application Guidance

Consider the aspects of construction phasing and the use of future building footprints for staging areas and temporary disturbance locations. On projects that are only a portion of a larger development and artificial site boundaries are defined for the LEED project, be sure that they are reasonable, logical, chosen with all credits in mind, and that their use is consistent through all credits. For multiple buildings, consider aggregating any restored previously degraded parts of the site as larger areas of habitat are more effective.

SS Credit 5.2

Version 2.1: Reduced Site Disturbance - Development Footprint

Version 2.2: Site Development - Maximize Open Space

Application Guidance

Requirements

Open space area can be either adjacent to the building(s) or at another location on the campus. It must be aggregated and contiguous, not divided and dispersed. The open space may be at another campus site as long as it is placed in a permanent reserve status.

Submittals

- If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template.
- For campus areas where the choice is made to have the open space set-aside not adjacent to the buildings provide documentation showing the requirements have been met and the land is in a natural state or been returned to a natural state and conserved for life of the buildings.

Supplementary Application Guidance

Open space does not have to be contiguous to the building(s) to which it is accredited. Open space may be aggregated and set aside as a larger plot of land. The land must be in a natural state or returned to a natural state; quads and playing fields do not count towards attaining this credit. This may enhance ecosystems and provide a larger piece of habitat. Clustering of buildings is good practice in terms of concentrating the impact of development in a limited area, leaving more of the site in its natural state, or providing for larger areas of habitat. Establishment of the project boundary with all credits in mind can enhance this process. Vegetated roofs may also contribute to credit compliance if the plantings meet the definition of native/adapted.

SS Credit 6.1

***Version 2.1:* Stormwater Management - Rate and Quantity**

***Version 2.2:* Stormwater Design: Quantity Control**

Application Guidance

Requirements

The credit requirements may be met using a centralized approach affecting the defined project site and that is within the campus boundaries. Distributed techniques based on a watershed approach are then required.

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template. Demonstrate that centralized stormwater management strategies using distributed technologies achieve credit performance requirements.

Supplementary Application Guidance

A master planning approach to storm water management and overall impervious surface management that is campus-wide or based on the local watershed is preferred over stormwater management planning limited to one project site at a time. The campus setting with larger boundaries and settings allows comprehensive stormwater management techniques to be applied on a larger scale and with more flexibility. This provides economies of scale and affords greater opportunities for clustering buildings, increasing natural settings, and applying distributed management techniques cost effectively. Phasing of projects may affect when a Master Plan is implemented and how the specific building(s) under consideration will be accommodated.

SS Credit 6.2

1 Point

Version 2.1: Stormwater Management – Treatment

Application Guidance

Same as credit 6.1.

SS Credit 7.1: Heat Island Effect - Non-Roof

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template and list the buildings meeting this credit.

Supplementary Application Guidance

The campus setting with larger boundaries and settings allows comprehensive heat island management techniques to be applied on a larger scale and with more flexibility. This provides economies of scale and affords greater opportunities for clustering buildings, increasing pervious surfaces and natural settings, and applying management techniques cost effectively.

SS Credit 7.2: Heat Island Effect - Roof

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template and provide a list of buildings meeting the credit.

Supplementary Application Guidance

An average of compliance for building roof areas may be used to meet these requirements when more than one building is on the site. For each building or for the group of buildings, combinations of high albedo and vegetated roof must collectively cover 75% of the roof area.

SS Credit 8: Light Pollution Reduction

Application Guidance

Requirements

Develop an exterior lighting master plan that includes the project site and the surrounding buildings in a comprehensive manner addressing the safety and security issues of the campus environment by sharing exterior lighting amenities while minimizing light pollution and energy consumption. The lighting master plan must show that it incorporates the credit requirements as well as the following:

- How this plan will reduce light trespass and night sky access and specific projects fit into the overall design.
- How safety, security, and comfort will be enhanced by the use of a master plan.

Submittals

- Provide exterior lighting master plan that addresses the project site and buildings and infrastructure showing how overall light pollution is reduced.
- Provide a design narrative from the Architect, Electrical Engineer, or responsible party that demonstrates what measures have been implemented for the registered LEED building(s) to meet the provisions of the exterior lighting master plan in the campus requirements.

WATER EFFICIENCY

WE Credit 1: Water Efficient Landscaping

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template. Submit appropriate documentation supporting the design of the rainwater collection system, the landscape design, and the extent of the supplemental temporary irrigation system.

Supplementary Application Guidance

Landscaping in the larger context of the campus provides abundant opportunity to implement solutions that require less water and for capturing rainwater or recycled water. Large campuses may consider treating its buildings' wastewater to standards for non-potable uses.

While consistency in site boundaries is required, the initial flexibility in site boundary selection and building clustering options allow for enhanced opportunities for sharing captured or reusable water. The project may also use native plants and other landscape alterations leading to a lower water demand. A temporary irrigation system may be used during establishment period for landscape.

WE Credit 2: Innovative Wastewater Technologies

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter weighted aggregate data in the Submittal Template.

Supplementary Application Guidance

When the site has more than one building, a weighted average of the site buildings, based on square footage, must be used to meet the requirements of the credit. This method ensures that each building generally meets the performance requirements.

Opportunities of scale may also allow more effective use of rain harvesting techniques or innovative and economical waste treatment technologies for the building(s) on the site. Options

include packaged biological nutrient removal systems, constructed wetlands, and high-efficiency filtration systems.

WE Credit 3: Water Use Reduction

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter weighted aggregate data in the Submittal Template.

Supplementary Application Guidance

When the site has more than one building, a weighted average of the site buildings, based on square footage, must be used to meet the requirements of the credit. This method ensures that each building generally meets the performance requirements.

Opportunities of scale may also allow more effective use of certain techniques in differing buildings on the site.

Because of the varying occupant numbers in some types of campus buildings (including students, staff, and visitors) an alternative method of calculating this credit may be used. Rather than basing the calculations on the number of occupants, the water use may be based on the total number of each type of applicable fixtures in the building and the estimated number of uses for each of these. For example, for public water closets a sample calculation is as follows: $\text{Total Daily Water Use (Public WC)} = \text{Total Number Of Fixtures} \times \text{Estimated Daily Uses} \times \text{Flow Rate(GPF)} \times \text{Duration}$

The calculations should use the same fixture count and daily use numbers for the base and proposed case. This provides a reasonable representation of base and proposed case water use. Calculations should include all flush fixtures and the following flow fixtures: public and private lavatories, public and private showers, kitchen faucets, and laboratory and service lavatories.

The following as process loads may be excluded: eyewash fountains, emergency showers, water coolers, and water fountains.

ENERGY & ATMOSPHERE

EA Prerequisite 1

Version 2.1: Fundamental Building Systems Commissioning

Version 2.2: Fundamental Commissioning of the Building Energy Systems

Application Guidance

Requirements

Each building in a project must independently meet the requirements of this prerequisite.

Supplementary Application Guidance

Every building on the project site must document compliance. An employee in the owner's organization, who is not responsible for project design or construction management or supervision of the project and who has the appropriate credentials, would be the preferred commissioning authority for EA Prerequisite 1. The documentation for EA Prerequisite 1 may be from the design firm, but the individual acting as the commissioning authority must not be responsible for project design, construction management, or supervision.

In the campus setting, other elements and site features associated with a building project, such as fountains, irrigation system, wheelchair lifts, 'help phones', and exterior lighting systems which are not actual part of a building should also be considered for the commissioning process.

Many campus organizations have commissioning requirements for all projects such as a Project Delivery Process (PDP) Manual which outlines required commissioning related steps for each project phase, from initial scoping to closeout. It is suggested that these types of documents be reviewed for compliance with the LEED fundamental commissioning requirements and be modified, if necessary, to ensure that the strategies employed by the design team to achieve the fundamental commissioning credit fulfills all requirements set forth by the LEED reference guide. A local document or manual as well as any specifications that reference the manual may be submitted along with documentation of how the local manual and procedures specifically meet or exceed the referenced LEED standard. A local manual may serve as documentation for the development of the commissioning plan as long as the manual also complies with the LEED reference guide. The intent of the fundamental commissioning prerequisite will be met assuming the applicant provides information demonstrating their standard building practices, as outlined in the locally-generated procedures manual, meet or exceed the LEED referenced commissioning requirements.

EA Prerequisite 2: Minimum Energy Performance

Application Guidance

Requirements

Each building in a project must independently meet the requirements of this prerequisite.

Supplementary Application Guidance

When designing a group of buildings, orientation and site utilization can have a major impact on energy consumption. Consider the group of buildings as a whole for the application of passive tempering and alternative energy applications.

EA Prerequisite 3

***Version 2.1:* CFC Reduction in HVAC&R Equipment**

***Version 2.2:* Fundamental Refrigeration Management**

Application Guidance

Requirements

Each building in the project must meet this prerequisite. If the building(s) is connected to a central chilled water system, that system must either be CFC free or a commitment to phasing out CFC-based refrigerants must be in place, with a firm timeline of five years from completion of the project. Prior to phase out, reduce annual leakage of CFC-based refrigerants to 5% or less using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting.

An alternative compliance path for buildings connected to a central chilled water system requires a third party (as defined in the LEED-EB Reference Guide) audit showing that system replacement or conversion is not economically feasible. The definition of the required economic analysis is: the replacement of a chiller(s) will be considered to be not economically feasible if the simple payback of the replacement is greater than 10 years. To determine the simple payback, divide the cost of implementing the replacement by the annual cost avoidance for energy that results from the replacement and any difference in maintenance costs including make-up refrigerants. If CFC-based refrigerants are maintained in the central system, reduce annual leakage to 5% or less using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting and reduce the total leakage over the remaining life of the unit to less than 30% of its refrigerant charge.

Submittals

Provide a LEED Submittal Template, signed by a licensed professional engineer or architect and an attached list of the buildings declaring that each building's HVAC&R systems do not use CFC-based refrigerants.

OR

Provide a modified LEED Submittal Template, signed by a licensed professional engineer or architect with an attached list of the buildings and a letter of commitment from the campus/installation declaring its intention to phase-out CFCs and a summary of the phase out plan describing actions and approximate time frame. AND demonstrate that until phase out, existing CFC containing equipment meets EPA Title VI, Rule 608, procedures for refrigerant management and reporting.

OR

Provide results of third-party audit demonstrating that replacement is not economically feasible based a 10-year simple pay-back analysis. AND provide documentation showing compliance with EPA Clean Air Act, Title VI, Rule 608 governing refrigerant management and reporting. Provide documentation showing that the annual refrigerant leakage rate is below 5%, and the leakage over the remainder of unit life is being maintained below 30%.

Supplementary Application Guidance

If connecting to a central system containing CFC refrigerants operate according to USEPA criteria and plan for phasing out the CFC refrigerants. The use of CFCs in central plants is an ongoing issue for the campus environment. Systems using CFCs are older and less efficient than newer systems using modern refrigerants. It is in the best interests of all to phase out the use of CFCs from several perspectives including ozone depletion, global warming potential, and energy efficiency. When funds are lacking to modernize central chiller plants, the use of third party financing may be a viable alternative if the energy savings from the new equipment can pay for the initial investment. Consider contracting with an energy services company that fronts the equipment, guarantees savings, and is paid out of a share of the savings.

EA Credit 1: Optimize Energy Performance

Application Guidance

Requirements

This credit applies to each building within the project scope. To receive a single rating for a group of buildings, use a weighted average for the group of buildings based on their conditioned square footage, or aggregate the data into one PRM calculation, so that performance is achieved by buildings of varying sizes within a certifying group. Each building must still meet EA Prerequisite 1 and may receive its own rating if that is desired.

Supplementary Application Guidance

Consider energy sources such as waste heat or recovered resources. Reduced energy cost may reflect the effect of time-dependent valuation of energy (time-of-use) rates or demand charges when working in conjunction with permanently installed efficiency or storage systems. Environmental impacts result from the operation and expansion of energy infrastructure both on and off site. Application of the more efficient combined heat and power systems and energy storage systems may be applied more effectively in the campus environment. Since the buildings are rated based upon the energy (and its cost) that crosses the building boundary, more efficient central energy systems and thermal storage should be used as the basis of energy cost reductions in the calculation of the building's energy performance. Calculation instructions for Version 2.1 and 2.2 will be supplied as supplements to the respective Reference Guides.

EA Credit 2: On-Site Renewable Energy

Application Guidance

Requirements

A group of buildings may be evaluated on a group average, based on square footage, or each building may receive its own rating.

Submittals

For multiple buildings either use aggregate data in the Submittal Template and provide a list of the buildings or provide a Submittal Template for each building.

Supplementary Application Guidance

Consider orientation of the buildings as a group for maximum access to renewable energy. A central renewable energy system may be more cost effective than individual systems on the separate buildings. In the case where the renewable energy equipment is not physically located

on the applicant building(s), provide data for each building showing the projected energy consumption and the percentage to be met with their prorated or dedicated share of renewable energy. The owner should also submit a certification letter acknowledging that the renewable energy from a central system will apply only to the submitted project(s) and will not be applied to subsequent buildings for any future LEED certifications.

Another campus consideration may be the energy used to light pathways and other connective routes between multiple buildings in a group. For Version 2.1, the energy benefit of solar-powered pole lights can be applied to EA Credit 2 (Renewable Energy) on a special calculation basis. Normally, site lighting is not included in the ASHRAE 90.1 energy model unless attached to the building. After the energy modeling is completed, add the unregulated site lighting's electricity requirements to the design case's Regulated Subtotal (DEC) and add the solar-powered pole lights' contribution to it. This special calculation method awards the use of the technology within the appropriate context. The pole lighting contribution is not to be factored into EA Credit 1 calculations. Version 2.2 Option 1 accounts for site lighting within the updated referenced standard.

EA Credit 3

1 Point

Additional (Enhanced) Commissioning

Application Guidance

Requirements

Each building in a project must independently meet the requirements of this credit.

Supplementary Application Guidance

The Reference Guide elaborates that the intent of the credit is that "The Additional Commissioning Credit ensures peer review through independent, third party verification." An employee in the owner's organization, who is not responsible for the management or design of the project and who has the appropriate credentials, may serve as the "independent" commissioning authority. For example, if a university has architects who design the campus buildings, an engineer from the facility management staff can be considered the independent commissioning authority.

EA Credit 4

Version 2.1: Ozone Protection

Version 2.2: Enhanced Refrigerant Management

Application Guidance

Requirements

Each building in a multiple building project must meet the requirements of this credit in order to achieve it. In a campus setting, even if the project is only a single building, this often involves a central plant.

Version 2.1: If the building(s) is (are) connected to a central chilled water system, that system must be HCFC free or a commitment must be in place to phasing out HCFC-based refrigerants within 5 years from completion of the project.

Version 2.2: If the building(s) is (are) connected to a central chilled water system, that system must meet the credit requirements.

Supplementary Application Guidance

This credit is problematical to some campus situations where the central system is not owned by the campus operator. Negotiations with the chilled water supplier may be effective in getting their commitment to comply with v2.1 or v2.2 requirements. For Version 2.2, have the chilled water supplier perform the required calculations and submit a letter showing compliance.

In the selection of refrigerants, consider their global warming potential as part of the analysis criteria. A life-cycle analysis that includes the future impact of the Montreal Protocol should guide choice of refrigerants.

EA Credit 5: Measurement and Verification

Application Guidance

Requirements

Each building in a project must independently meet the requirements of this credit.

Submittals

If there are multiple buildings, attach a list of the buildings meeting the credit criteria. Separate M&V plans may be required for buildings that significantly differ.

Supplementary Application Guidance

Consider adding the functions that meet the requirements of this credit to a central energy management and control system for the campus. This would allow a continuous commissioning process for the building and maintenance issues could be centrally alarmed and personnel dispatched to keep systems in peak operating mode.

EA Credit 6: Green Power

Application Guidance

Requirements

Green power may be purchased on a centralized basis and credit attributed to a specific project. This same green power may not be credited to another project.

Submittals

Provide certification that any purchased green power is solely applied as credit to this project. If more than one building is to receive credit, provide data for each building showing the projected energy consumption of the buildings and the percentage to be met with green power. If the green power is generated by a campus entity, show that it meets Green-e standards.

Supplementary Application Guidance

Volume discounts are available from some Green Tag brokers. Therefore, it may be financially advantageous to the campus owner if multiple buildings are achieving this credit. Cogeneration from renewable sources (that meet Green-e standards) would be credited in EA Credit 2. Consider ID Credits for exemplary performance when 100% of green power content is used for extended periods.

MATERIALS & RESOURCES

MR Prerequisite 1: Storage & Collection of Recyclables

Application Guidance

Requirement

A central sorting and collection facility serving multiple buildings will also meet the intent of this credit as long as provisions are made for the collection of the recyclable materials within each building.

Submittals

If a central facility is used for sorting and/or temporary storage, include a narrative that succinctly describes collection procedures, frequency (based on generation estimates) and facilities.

MR Credit 1.1 to 1.3: Building Reuse

Application Guidance

Submittal

If there are multiple buildings in the project scope, enter aggregate data in the primary Submittal Template. Also provide one hardcopy version of the Submittal Template for each building's data.

MR Credit 2: Construction Waste Management

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template.

Supplementary Campus Application Guidance

Additional strategies for campuses include documenting salvage that occurs by owner organizations prior to the building being turned over to contractors for demolition including

offering materials to academic programs on campus such as fine arts or architectural studios or for troop construction projects on military installations.

MR Credits 3 through 7

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template.

INDOOR ENVIRONMENTAL QUALITY

EQ Prerequisite 1: Minimum IAQ Performance

Application Guidance

Requirements

If there are multiple buildings on the project site, each building must independently meet the requirements.

EQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

Application Guidance

Requirements

If there are multiple buildings on the project site, each building must independently meet the requirements.

Version 2.1 projects can use any Version 2.2 compliance path (v2.2 requirements are simply a compilation of v2.1 credit rulings).

Submittals

List all buildings and identify which method was used on each.

EQ Credit 1: Carbon Dioxide (CO₂) Monitoring

Application Guidance

Requirements

If there are multiple buildings on the project site, each building must independently meet the requirements.

EQ Credit 2: Ventilation Effectiveness

Application Guidance

Requirements

If there are multiple buildings on the project site, each building must independently meet the requirements.

EQ Credit 3.1 and 3.2: Construction IAQ Management Plan

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Version 2.1 projects can use any Version 2.2 compliance path (v2.2 requirements are simply a compilation of v2.1 credit rulings).

EQ Credit 4.1: Low-Emitting Materials - Adhesives & Sealants

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Application Guidance

Version 2.2 requirements are more stringent than Version 2.1.

EQ Credit 4.2: Low-Emitting Materials - Paints and Coatings

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Application Guidance

Version 2.2 requirements are more comprehensive (and thus more stringent) than Version 2.1.

EQ Credit 4.3: Low-Emitting Materials - Carpet

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

EQ Credit 4.4: Low-Emitting Materials - Composite Wood

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Application Guidance

Version 2.2 requirements are more comprehensive (and thus more stringent) than Version 2.1.

EQ Credit 5: Indoor Chemical & Pollutant Source Control

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

EQ Credit 6.1: Controllability of Systems- Perimeter Spaces

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Campus Application Guidance

Examine trade-offs of natural ventilation using operable windows in spaces that will need to be darkened for projection equipment. Some types of power operated black-out shades can be pulled from their tracks by breezes through large window openings. If natural ventilation is a priority and power shades are also required, employ strategies that do not utilize the glazing area of the exterior walls.

EQ Credit 6.2: Controllability of Systems, Non-Perimeter Spaces

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

EQ Credit 7.1: Thermal Comfort- Compliance with ASHRAE 55-1992

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Campus Application Guidance

Version 2.1 projects can use the Version 2.2 compliance path (v2.2 requirements are simply a compilation of v2.1 credit rulings).

EQ Credit 7.2: Thermal Comfort- Permanent Monitoring System

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

EQ Credit 8.1 and 8.2: Daylight and Views

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

INNOVATION & DESIGN PROCESS

ID Credit 1.1 – 1.4: Innovation in Design

Application Guidance

In the campus setting and with multiple buildings, additional innovative opportunities arise, specifically with infrastructure and site issues. Economies of scale allow for more creativity and application of initiatives with larger scopes. The strategies and documentation for achieving innovation credits related to the site may be “duplicated” in multiple buildings or multiple applications for separate buildings, provided a clear description of how the whole site achieves the intended credits is presented. It must be clear that none of the required areas or facilities is counted twice. Each credit should be carefully assessed and treated fairly, respective of overall site issues (e.g., pervious surfaces) versus individual building issues (e.g., roofing). For example, if the project is applying for SSc5.2, which requires that permanent open space be designated adjacent to the building, the area of this open space must reflect the combined footprints of all of the buildings.

An innovation credit is warranted if activities and/or programs inspired by a LEED project are applied to the campus as a whole, thus delivering correspondingly larger environmental benefit.

ID Credit 2: LEED Accredited Professional

No application guidance is necessary.

APPENDIX O
LEED Multiple Contractor Responsibilities Table

LEED Credit Paragraph	LEED 3.0 Multiple Contractor Responsibilities Table	Building CTR Substitution Permitted	Site CTR Substitution Permitted	Required Points Strategy	
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BUILDING: Basic Training (BT) BARRACKS

PAR	FEATURE				REMARKS
CATEGORY 1 – SUSTAINABLE SITES					
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	NIC	NO	R	Building D/B Ctr is primary permittee
SS1	Site Selection	NIC	NO	1	Reference Section 01 10 00, par. 6.14.5 LEED Credits Coordination.
SS2	Development Density & Community Connectivity	NIC	NO		Not Targeted
SS3	Brownfield Redevelopment	NIC	NO		Not Targeted
SS4.1	Alternative Transportation: Public Transportation Access	NIC	NO		
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	NO	NO	1	D/B CTR responsible.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1	NIC	YES		Not Targeted
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	NIC	YES		Not Targeted
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3	NO	NO		Not Targeted
SS4.4	Alternative Transportation: Parking Capacity	NO	NO	2	Site CTR responsible.
SS5.1	Site Development: Protect or Restore Habitat	NIC	YES	1	Site CTR responsible.
SS5.2	Site Development: Maximize Open Space	NIC	YES	1	Site CTR responsible.
SS6.1	Stormwater Design: Quantity Control	NIC	YES	1	Site CTR responsible.
SS6.2	Stormwater Design: Quality Control	NIC	YES		
SS7.1	Heat Island Effect: Non-Roof	NIC	YES	1	Building CTR responsible.
SS7.2	Heat Island Effect: Roof	YES	NIC	1	Building CTR responsible.
SS8	Light Pollution Reduction	NO	NO	1	Combined Bldg/Site credit. Building CTR responsible for building lighting rqmts. Site CTR responsible for site lighting rqmts.
CATEGORY 2 – WATER EFFICIENCY					
WEPR1	Water Use Reduction: Reduce by 20% (PREREQUISITE)	NO	NO	R	
WE1.1	Water Efficient Landscaping: Reduce by 50%	NIC	YES	2	Site CTR responsible.

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LEED Credit Paragraph	LEED 3.0 Multiple Contractor Responsibilities Table	Building CTR Substitution Permitted	Site CTR Substitution Permitted	Required Points Strategy	
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BUILDING: Basic Training (BT) BARRACKS

PAR	FEATURE				REMARKS
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	NIC	YES	2	Site CTR responsible.
WE2	Innovative Wastewater Technologies - OPTION 1	NO	NO		Not Targeted
WE2	Innovative Wastewater Technologies - OPTION 2	NIC	YES		Not Targeted
WE3.1	Water Use Reduction: 30% Reduction	YES	NIC	2	Building CTR responsible.
WE3.2	Water Use Reduction: 35-40% Reduction	YES	NIC		

CATEGORY 3 – ENERGY AND ATMOSPHERE

EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	NO	NO	R	Building CTR responsible for commissioning of building systems. D/B CTR responsible for commissioning of site systems.
EAPR2	Minimum Energy Performance (PREREQUISITE)	NO	NIC	R	Building CTR responsible.
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	NO	NIC	R	Building CTR responsible.
EA1	Optimize Energy Performance	YES	NIC	10	Building CTR responsible. Must comply with EPACT 2005 minimum energy performance.
EA2	On-Site Renewable Energy	YES	NO		Not Targeted
EA3	Enhanced Commissioning	NO	NO	2	Building CTR responsible.
EA4	Enhanced Refrigerant Management	YES	NIC		Building CTR responsible. Evaluate during design
EA5	Measurement & Verification	YES	NIC	3	Achievable
EA6	Green Power	NO	NIC		Not Targeted

CATEGORY 4 – MATERIALS AND RESOURCES

MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	NIC	NO	R	Combined Bldg/Site credit. Building CTR provides collection area in Building. Site CTR provides enlarged dumpster area(s) to accommodate recycling receptacles as well as dumpsters.
MR1.1	Building Reuse- Structure: Maintain Existing Walls, Floors & Roof	YES	NO		Not Targeted
MR1.2	Building Reuse- Interior: Maintain 50% of Non-Structural Elements	YES	No		Not Targeted

LEED Credit Paragraph	LEED 3.0 Multiple Contractor Responsibilities Table	Building CTR Substitution Permitted	Site CTR Substitution Permitted	Required Points Strategy	
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BUILDING: Basic Training (BT) BARRACKS

PAR	FEATURE				REMARKS
MR2.1	Construction Waste Management: Divert 50% From Disposal	NO	NO	1	Combined Aggregate credit. Building CTR responsible for diversion of minimum 50% of waste generated. Site CTR responsible for diversion of minimum 50% of waste generated. No on-post recycling facility available for GC use.
MR2.2	Construction Waste Management: Divert 75% From Disposal	NO	NO		Combined Aggregate credit. Building CTR responsible for diversion of minimum 75% of waste generated. Site CTR responsible for diversion of minimum 75% of waste generated.
MR3.1	Materials Reuse: 5%	NO	NO		Not Targeted
MR3.2	Materials Reuse: 10%	NO	NO		Not Targeted
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	NO	NO	1	Combined Cumulative credit. Building CTR responsible for minimum 15% recycled materials. D/B CTR responsible for minimum 1% recycled materials. (Target steel, metals, finishes)
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	NO	NO		Combined Cumulative credit. Building CTR responsible for minimum 30% recycled materials. D/B CTR responsible for minimum 1% recycled materials.
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally	NO	NO	1	Combined Cumulative credit. Building CTR responsible for minimum 3% regional materials. D/B CTR responsible for minimum 30% regional materials. (Target masonry, CMU, concrete, asphalt)
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally	NO	NO		Combined Cumulative credit. Building CTR responsible for minimum 6% regional materials. D/B CTR responsible for minimum 60% regional materials. (include landscaping, interior finishes)
MR6	Rapidly Renewable Materials	YES	NIC		Not Targeted
MR7	Certified Wood	YES	NIC		Building CTR responsible. Evaluate during design

CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY

EQPR1	Minimum IAQ Performance (PREREQUISITE)	NO	NIC	R	Building CTR responsible.
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	NO	NO	R	Smoking is prohibited in non-residential federal facilities. Building CTR responsible for building ETS control features. D/B CTR responsible for site ETS features.
EQ1	Outdoor Air Delivery Monitoring	YES	NIC	1	Building CTR responsible.
EQ2	Increased Ventilation	YES	NIC		Building CTR responsible. Evaluate during design
EQ3.1	Construction IAQ Management Plan: During Construction	YES	NIC	1	Building CTR responsible.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	YES	NIC	1	Building CTR responsible.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	YES	NIC	1	Building CTR responsible.
EQ4.2	Low Emitting Materials: Paints & Coatings	YES	NIC	1	Building CTR responsible.

LEED Credit Paragraph	LEED 3.0 Multiple Contractor Responsibilities Table	Building CTR Substitution Permitted	Site CTR Substitution Permitted	Required Points Strategy	
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BUILDING: Basic Training (BT) BARRACKS

PAR	FEATURE				REMARKS
EQ4.3	Low Emitting Materials: Flooring Systems	YES	NIC	1	Building CTR responsible.
EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	YES	NIC	1	Building CTR responsible.
EQ5	Indoor Chemical & Pollutant Source Control	YES	NIC	1	Building CTR responsible. Fax/Copy and Janitor
EQ6.1	Controllability of Systems: Lighting	YES	NIC	1	Building CTR responsible. Task Lighting
EQ6.2	Controllability of Systems: Thermal Comfort	YES	NIC		Building CTR responsible. Possible with UFAD.
EQ7.1	Thermal Comfort: Design	YES	NIC	1	Building CTR responsible.
EQ7.2	Thermal Comfort: Verification	YES	NIC	1	Building CTR responsible.
EQ8.1	Daylight & Views: Daylight 75% of Spaces	YES	NIC		Not Targeted
EQ8.2	Daylight & Views: Views for 90% of Spaces	YES	NIC		Not Targeted

CATEGORY 6 – INNOVATION & DESIGN PROCESS

IDc1.1	Innovation in Design	YES	YES	1	
IDc1.2	Innovation in Design	YES	YES	1	
IDc1.3	Innovation in Design	YES	YES	1	
IDc1.4	Innovation in Design	YES	YES	1	
IDc1.5	Innovation in Design	YES	YES	1	
IDc2	LEED Accredited Professional	NO	NO	1	

CATEGORY 7 – REGIONAL PRIORITY CREDITS

SSc4.1	Alternative Transportation, Public Transportation Access	NIC	NO		
SSc6.1	Stormwater Design, Quality Control	NIC	YES	1	
WEc3	Water Use Reduction for 40%	YES	NIC	1	
EAc1	Optimize Energy Performance for 28%	YES	NIC	1	
EAc2.1	On-Site Renewable Energy	YES	NO		
IEQc7.1	Thermal Comfort, Design	YES	NIC	1	
	TOTAL			55	

APPENDIX P

USGBC Registration of Army Projects

Typical Registration Procedure

1. Complete the online registration form (see guidance below) at the USGBC website <http://www.usgbc.org/showfile.aspx?documentid=875> and submit it online.
2. Pay the registration fee via credit card (USACE staff: credit card PR&C is funded by project design or S&A funds).
3. The USGBC will follow up with a final invoice, the LEED-online passwords and template information.
4. If you have any questions, the USGBC contact (as of October 08) is:
Courtney Yan, LEED Program Assistant
U.S. Green Building Council
202/587-7180
cyan@usgbc.org

Completing the Registration Form

BEFORE YOU BEGIN:

Create a personal account with USGBC if you do not have one.

You will need the following information:

Project name as it appears in P2 (obtain from USACE Project Manager)

Building number/physical address of project

Zip code for Installation/project location

Total gross area all buildings in project

Total construction cost for buildings only (see Project Details Section instructions below)

ACCOUNT/LOGIN INFORMATION SECTION

1. The person registering the project **must have an account with USGBC** (login and password) to complete the form. If you have an account, select "I already have a USGBC Web site account" and enter email and password (twice). If you do not have an account, you may select "Create a new USGBC website account" and follow the instructions. It is recommended that you create an account separately on the USGBC website before you start the form. IMPORTANT: USACE team members are members of USGBC and are eligible for Member prices. USACE team members registering projects should be sure to include the USACE Corporate Access ID on the form (if you do not have it contact richard.l.schneider@usace.army.mil or judith.f.milton@usace.army.mil for the number).
2. The Account/Login Information section is filled out by the person registering the project. It may be a Contractor or a USACE staff member.

PROJECT TYPE SECTION

Self-explanatory. As of October 08 USACE projects use LEED for New Construction V2.2. USACE staff members are USGBC members.

GENERAL PROJECT INFORMATION SECTION

Project Title: Match the project name used in P2. Contact the USACE Project Manager for this information.

Is Project Confidential: Indicate NO except if project has security sensitivity (elements that are FOUO or higher security) indicate YES.

Project Address 1 and 2: This is the physical location of the project. Provide building number, street address, block number or whatever is known to best describe the location of the project on the Installation.

Project City: Installation Name

State, Country, Zip Code: Self-explanatory

How Did You Hear About LEED: USACE requirement

PRIMARY CONTACT INFORMATION

The Primary Contact may be a Contractor or a USACE staff member. USGBC considers this individual the primary point of contact for all aspects of the project. It is recommended this person be the Contractor Project Manager or the USACE Project Manager.

PROJECT OWNER INFORMATION

Project Owner First Name, Last Name, email: The Project Owner is the USACE Project Manager.

Organization Name: U.S. Army Corps of Engineers. This field **MUST** be completed this way because it will be used as a search field by higher HQ to find all USACE registered projects.

PROJECT DETAILS

Owner Type: Military Base

Project Scope: Provide brief description (example: barracks complex)

Site Conditions: Provide brief description (example: wooded with steep grades)

Occupant Type: Provide brief description (example: military and civilian employees)

Owner Occupied: No

Gross Square Footage: Provide total area all buildings in project

Project Budget: Do not include the cost for design, site work, demolition, abatement or other work – do not include Government contingency or supervision costs. For design-build and construction projects registered after award, use the awarded contract cost for construction of buildings only. For projects registered prior to award of design-build or construction contract, use the total Primary Facility cost from DD1391 or updated Primary Facility cost based on design development if available.

Current Project Phase: Identify phase at time of registration (example: design start, construction start)

Project Type: Self-explanatory

PAYMENT INFORMATION

Self-explanatory

APPENDIX Q
REV 1.1 – 31 MAY 2009
AREA COMPUTATIONS

Computation of Areas: Compute the "gross area" and "net area" of facilities (excluding family housing) in accordance with the following subparagraphs:

(1) Enclosed Spaces: The "gross area" is the sum of all floor spaces with an average clear height $\geq 6'-11"$ (as measured to the underside of the structural system) and having perimeter walls which are $\geq 4'-11"$. The area is calculated by measuring to the exterior dimensions of surfaces and walls.

(2) Half-Scope Spaces: Areas of the following spaces shall count as one-half scope when calculating "gross area":

- Balconies
- Porches
- Covered exterior loading platforms or facilities
- Covered but not enclosed passageways and walks
- Open stairways (both covered and uncovered)
- Covered ramps
- Interior corridors (Unaccompanied Enlisted Personnel Housing Only)

(3) Excluded Spaces: The following spaces shall be excluded from the "gross area" calculation:

- Crawl spaces
- Uncovered exterior loading platforms or facilities
- Exterior insulation applied to existing buildings
- Open courtyards
- Open paved terraces
- Uncovered ramps
- Uncovered stoops
- Utility tunnels and raceways
- Roof overhangs and soffits measuring less than 3'-0" from the exterior face of the building to the fascia

(4) Net Floor Area: Where required, "net area" is calculated by measuring the inside clear dimensions from the finish surfaces of walls. If required, overall "assignable net area" is determined by subtracting the following spaces from the "gross area":

- Basements not suited as office, special mechanical, or storage space
- Elevator shafts and machinery space
- Exterior walls
- Interior partitions
- Mechanical equipment and water supply equipment space
- Permanent corridors and hallways
- Stairs and stair towers
- Janitor closets
- Electrical equipment space
- Electronic/communications equipment space

RMS SUBMITTAL REGISTER INPUT FORM			CONTRACT NUMBER		DELIVERY ORDER																				
TITLE AND LOCATION																									
Button	<-----Right click for Instructions		TYPE OF SUBMITTAL								CLASSIFICATION				REVIEWING OFFICE										
SECTION	PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	01 - PRECON SUBMITTALS	02 - SHOP DRAWINGS	03 - PRODUCT DATA	04 - SAMPLES	05 - DESIGN DATA	06 - TEST REPORTS	07 - CERTIFICATES	08 - MFRS INSTRUCTIONS	09 - MFRS FIELD REPORT	10 - O&M DATA	11 - CLOSEOUT SUBMITTALS	FID - FOR INFORMATION ONLY	GA - GOVERNMENT APPROVED	DA - DESIGNER OF RECORD APPROVAL	CR - CONFORMANCE REVIEW	DA / CR	DA / GA	DO - DISTRICT OFFICE	AO - AREA OFFICE	RO - RESIDENT OFFICE	PO - PROJECT OFFICE	DR - DESIGNER OF RECORD	AE - ARCHITECT / ENGINEER
00 72 00	52.236-13	Accident Prevention Plan	X														X			X					
00 73 00	1.11	Dev. From Accept. Design. No Deviation from Contract					X										X			X				X	
00 73 00	1.11	Dev. From Accepted Design - Deviates from Contract					X											X		X				X	
00 73 00	1.17	Supplemental Price Breakdown	X										X							X					
00 73 00	1.18	SSHO Qualifications	X											X						X					
01 10 00	5.2.3.1	(if concrete pavement) Joint Layout Plan with design drawings					X									X									
01 10 00	5.5.2	Building Envelope Sealing Performance Testing						X					X							X					
01 10 10	***	Tests as Req by Codes - DOR Develops Test Program						X						X						X			X		
01 10 00	5.8.3	BAS Review Information		X													X			X	X			X	
01 10 00	5.8.3	BAS Performance Verification Test						X						X						X				X	
01 10 00	5.8.4	Testing Adjusting and Balancing						X						X						X				X	
01 10 00	5.8.5	Commissioning						X						X						X				X	
01 10 00	6.15	Environmental As Required for Site Specific					X									X				X				X	
01 10 00	6.16	Permits as required for Site specific					X									X				X				X	
01 10 00	5.10.2	Fire Protection Tests						X	X				X							X				X	
01 32 01.00 10	3.4.1	Preliminary Project Schedule	X											X						X					
01 32 01.00 10	3.4.2	Initial Project Schedule	X											X						X					
01 32 01.00 10	3.4.3	Design Package Schedule	X											X						X					
01 32 01.00 10	3.6.1	Periodic schedule updates from the Contractor	X											X						X					
01 32 01.00 10	3.7	Time Extension Request (Schedule)	X											X						X					
01 33 00	1.8	Submittal Register - DOR Input Required	X											X						X				X	
01 33 00	1.8	Submittal Register Updates (Design Packages, etc.)	X											X						X				X	
01 33 00	1.3.1	Substitution of Manuf or Model Named in Proposal		X	X												X			X				X	
01 33 16	1.2	Identify Designer(s) of Record	X											X						X					
01 33 16	1.1.2 / 3.2.4	Fast Track Design Package(s)					X									X			X	X					
01 33 16	1.2	Identification of all Designers of Record	X													X				X					
01 33 16	3.2.1	Site and Utility Des Package, incl. Substantiation					X									X				X	X				
01 33 16	3.2.2/3.5	Interim Des Subm Package(s), incl. Substantiation					X									X				X	X				
01 33 16	3.5.1	Drawings					X									X				X	X				
01 33 16	3.5.2.2	Sitework Design Analyses					X									X				X	X				
01 33 16	3.5.2.3	Structural Design Analyses					X									X				X	X				
01 33 16	3.5.2.4	Security Design Analyses					X									X				X	X				
01 33 16	3.5.2.5	Architectural Design Analyses					X									X				X	X				
01 33 16	3.5.2.6	Mechanical Design Analyses					X									X				X	X				
01 33 16	3.5.2.7	Life Safety Design Analyses					X									X				X	X				
01 33 16	3.5.2.8	Plumbing Design Analyses					X									X				X	X				
01 33 16	3.5.2.9	Elevator Design Analyses (as Applicable)					X									X				X	X				
01 33 16	3.5.2.10	Electrical Design Analyses					X									X				X	X				
01 33 16	3.5.2.11	Telecommunications Design Analyses					X									X				X	X				
01 33 16	3.5.2.12	Cathodic Protection Design Analyses					X									X				X	X				
01 33 16	3.5.3	Geotechnical Investigations and Reports					X									X				X	X				
01 33 16	3.5.4	LEED Submittals					X									X				X	X				
01 33 16	3.5.5	Energy Conservation Documentation					X									X				X	X				
01 33 16	3.5.6	Specifications					X									X				X	X				
01 33 16	3.5.7	Building Rendering					X									X				X	X				
01 33 16	3.2.4/3.7	Final Des Submittal Package(s), incl. Substantiation					X									X				X	X				
01 33 16	3.7.5	DD Form 1354 (Transfer of Real Property)										X				X				X					
01 33 16	3.2.5/3.8	Design Complete Submittal Package(s)					X									X				X	X				
01 33 16	3.3.3	Design and Code Review Checklists					X									X				X	X				
01 33 16	A-2.0	SID - Interim and Final (as applicable)			X	X	X								X					X					
01 33 16	B-2.0	FFE (as Applicable)					X								X					X					
01 45 04.00 10	3.2	Design and Construction QC Plan	X													X				X					
01 57 20.00 10	1.2	Environmental Protection Plan	X													X				X					
01 78 02.00 10	1.2.1	Final as-Built Drawings											X		X										
01 78 02.00 10	1.2.7	Provide final as-built CADD and BIM Model files											X		X						X				
01 78 02.00 10	1.2.9	Provide scans of all other docs in Adobe.pdf format											X		X						X				
01 78 02.00 10	1.3.1	Equip-in-Place list of all installed equip and cost											X		X						X				
01 78 02.00 10	1.3.2	Data on equip not addressed in O&M manuals											X		X						X				
01 78 02.00 10	1.3.3	Final as-built specs - electronic files											X		X						X				
01 78 02.00 10	1.4.2.1	Warranty management plan - FAR 52.246-21											X		X						X				
01 78 02.00 10	1.4.2.1	Certificates of Warranty for extended warranty items											X		X						X				
01 78 02.00 10	1.4.2.1	Contractor's POCs for implementing warranty process											X		X						X				
01 78 02.00 10	1.4.2.1	List of each warranted equip, item, feature or system											X		X						X				
01 78 02.00 10	1.5	See also Section 01 10 00 par. 5.8.4 and 5.8.5											X		X						X				
01 78 02.00 10	1.6.1.2	Equipment O&M Manuals - 1 electronic / 2 hard copies											X		X						X				
01 78 02.00 10	1.7	Field Training DVD Videos										X		X							X				
01 78 02.00 10	1.8	Pricing of CF/CI and GF/CI Property											X	X							X				
01 78 02.00 10	1.11	List of Completed Cleanup Items											X				X				X				

APPENDIX AA

Fort Jackson Installation Specific Requirements

IMSE-JAC-ESP

10 June 2008

SUBJECT: Provost Marshal Office (PMO) Contract Briefing

For: Contractors Working on Fort Jackson

1. The Directorate of Contracting Office (DOC) Contract Administrator notifies this office when initial contract briefings are scheduled for awarded contracts. The Physical Security Section of the Provost Marshal Office (PMO) then makes every effort to have a representative in attendance to brief you first hand on those items of interest to us and of importance to you; however, a personal briefing may not always be possible. This written briefing is designed to cover such situations.
2. EO 12989 as amended states: "Sec. 5. (a) Executive departments and agencies that enter into contracts shall require, as a condition of each contract, that the contractor agree to use an electronic employment eligibility verification system designated by the Secretary of Homeland Security to verify the employment eligibility of: (i) all persons hired during the contract term by the contractor to perform employment duties within the United States; and (ii) all persons assigned by the contractor to perform work within the United States on the Federal contract."
3. Fort Jackson Regulation 190-5, titled Motor Vehicle Traffic Supervision, contains ALL pertinent information regarding operation of motor vehicles on Fort Jackson. It may be reviewed in its entirety at the PMO Police Services Section located in the Emergency Services Center Building 5499, located on Jackson Boulevard, Monday thru Friday, 0730-1600 hours. The following pertinent data is extracted for you:
 - a. The vehicle laws of the State of South Carolina apply on post. Infractions such as speeding incur ticket/fine/points and such cases are handled thru the off-post U.S. Magistrate Court.
 - b. Vehicles must be mechanically safe. Tailgates must be installed/closed on trucks and care taken not to litter when transporting any material(s).
 - c. Construction traffic is prohibited within the housing areas unless absolutely necessary to perform the job. Vehicle/equipment operations require drivers to use extreme care near troop and other personnel movements including movements through school zones.
 - d. Speed Restrictions:
 - (1) 25 MPH unless otherwise posted.
 - (2) 10 MPH when passing marching troops or troops in formation.

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- (3) 10 MPH in parking lots.
 - (4) 20 MPH in housing areas, hospital areas and school zones.
 - (5) 20 MPH through flashing yellow signal lights.
 - (6) 25 MPH on unpaved roads.
 - (7) 15 MPH when operating tracked vehicles.
- e. Stopping, Standing or parking laws-same as off post.
 - f. Restraint systems must be worn by all drivers and riders in/on all vehicles on Fort Jackson if the vehicle is so equipped.
 - g. The use of any type of electronic device while driving on Fort Jackson is PROHIBITED. This includes cell phones, hands-free devices, portable CD/DVD players, etc.. To use these devices, you must pull over and park in an authorized parking area.
4. Construction sites must be secured at all times, as these sites are susceptible to criminal activity. Since construction site work normally requires workers on the job site Monday thru Friday, 0700-1800 hours, the Military Police (when on routine patrol) may stop and question people on site during other than normal hours, ascertain their right/need to being there and complete a Field Interview Card. HOWEVER, YOU should realize that YOU'RE ultimately responsible for the actions of your employees and the SECURITY of your job site/s. Items you need to consider:
- a. Control all keys to buildings and vehicles.
 - b. Access Control-who's on site (authorized/visitors).
 - c. Equipment-how accounted for/how secured after working hours.
 - d. Vehicles-keys, locked doors/steering.
 - e. Site Lighting-adequate for hours of darkness and operational.
 - f. Wearing of items of military apparel such as camouflage fatigues is prohibited.
 - g. NO ONE involved in any construction project on Fort Jackson is allowed to carry or transport any type of weapon or concealed weapon while on Fort Jackson.
5. You may contact the MPs on a 24-hour basis in Building 5499 (Emergency Services Center) on Jackson Boulevard by dialing 751-3113/3114/3115/3116 from a commercial phone or 4-3113/3114/3115/3116 from a Fort Jackson office phone. For emergencies on post dial 911 to get police, fire and ambulance services. If using a commercial phone (not post 751 prefixed number), you'll get an off post 911 dispatcher and you'll need to explain that the emergency is on post (Fort Jackson) and you'll be transferred to the 911 dispatcher on post..
6. All contractors (to include sub-contractors) must provide to the PMO Physical Security Section a listing of employees including full Name, Date of Birth, Place of Birth (City, County, State, Country), and Social Security Number prior to work start date. Names WILL be subjected to an MP Police Check and check of the Post Bar Roster. If work is to be performed in a sensitive area such as arms, ammunition and explosive areas, the contractor is responsible for

requesting/paying for a State Law Enforcement Division (SLED) check of criminal history on ALL personnel, including Foreign Workers, providing the personal information listed above on company stationery to SLED headquarters, and returning the Police Checks to the Directorate of Contracting. NO ONE barred from Fort Jackson or who has committed serious crimes such as felonies will be allowed to enter/work on post. Furthermore, IAW EO 12989 (9 June 2008), Contractors agree to use an electronic employment eligibility verification system designated by the Secretary of Homeland Security to verify the employment eligibility of: (i) all persons hired during the contract term by the contractor to perform employment duties within the United States; and (ii) all persons assigned by the contractor to perform work within the United States on the Federal contract. All Foreign Workers MUST possess all proper/legal paperwork for Identification/entry on post and must be a LEGAL Immigrant or have a worker's Visa.

7. Fort Jackson is a controlled access installation. All personal and company vehicles must be registered to enter post. All pertinent information regarding registration along with other pertinent information is included in the attachment.
8. Again, it is our intent that you will receive a personal briefing from a PMO Physical Security Representative. However, in those rare instances when personal contact is impossible due to prior commitments, this information is provided for your use. Please direct any questions you might have either in person or by calling the 24-hour location/phone #s listed above in para 4. You may also contact personnel assigned to the PMO Physical Security Section, located in Building 5499, at 751-2006/2005/6019/7076 directly or leave a voice mail message.

FOR THE PROVOST MARSHAL:

Attach: Vehicle Registration and other
Helpful Information

Original Signed
BYRON K. JONES
Chief, Physical Security Section
DAC, YC-02

VEHICLE REGISTRATION AND OTHER HELPFUL INFORMATION

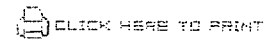
AS OF 9 June 2008

Contractors: IAW EO 12989 (9 June 2008), Contractors agree to use an electronic employment eligibility verification system designated by the Secretary of Homeland Security to verify the employment eligibility of: (i) all persons hired during the contract term by the contractor to perform employment duties within the United States; and (ii) all persons assigned by the contractor to perform work within the United States on the Federal contract.

Contractors must provide a letter on company letterhead addressed to the Directorate of Emergency Services/Provost Marshal Office, ATTN: Vehicle/Weapons Registration Section, giving the contract number, the expiration date of the contract, and sponsoring activity's endorsement. This letter should also state the name of the company representative who is authorized to register company vehicles, as well as the names of ALL employees of the company who will be required to enter the post to complete the requirements of the contract. If a subcontractor is required, the subcontractor's company name must be included. The primary contractor must notify the subcontractor that the above requirements must be completed for the subcontractor as well. In Order to register a contractor company vehicle or a contractor's POV, the following current information is required in addition to the above letter: Vehicle Registration, Proof of Insurance, Drivers License, and endorsement from sponsoring activity.

All contractors are responsible for removing decals from company vehicles when a contract is completed or terminated and turning them in to the Vehicle Registration Office. Decals on the vehicles of their employees must also be confiscated when the employee leaves or is terminated. These must also be turned in to the Vehicle Registration Office. Contractors ARE NOT AUTHORIZED to bring weapons onto Fort Jackson to include holders of concealed weapon permits issued by the state of South Carolina.

The Vehicle Registration Office is located in Room #114 of the Strom Thurmond Building #5450 located at the Intersection of Strom Thurmond Boulevard and Marion Avenue. Once vehicles have the proper registration, entry to the post can be gained thru Gates #1 (Fort Jackson Boulevard), Gate #2 (Forest Drive Boulevard), Gate #5 (Leesburg Road). Commercial vehicles and oversized vehicles/loads need to use Gate #4 (Percival Road and Boyden Arbor Road) as they cannot negotiate the barriers which are always in place at the other 3 gates and vehicle searches are conducted at Gate 4. Gates 4 and 5 are open 7 days a week. Gate 5 opens at 0445 hours AM and Gate 4 opens at 0500 hours AM. Both gates close at 2200 hours-10 PM. The 24 hour Military Police Station is located on Jackson Boulevard in Building #5499 at the intersection of Hill Street and Jackson Boulevard. For emergencies on-post dial 911 to get police, fire and ambulance services. If using your civilian access phone number, you'll get an off-post 911 dispatcher and you'll need to explain that the emergency is on-post (Fort Jackson) and you'll be transferred to the 911 dispatcher on-post.



6/10/2008

"I find, therefore, that adherence to the general policy of contracting only with providers that do not knowingly employ unauthorized alien workers and that have agreed to utilize an electronic employment verification system designated by the Secretary of Homeland Security to confirm the employment eligibility of their workforce will promote economy and efficiency in Federal procurement.

"NOW, THEREFORE, to ensure the economical and efficient administration and completion of Federal Government contracts, and by the authority vested in me as President by the Constitution and the laws of the United States of America, including subsection 121(a) of title 40 and section 301 of title 3, United States Code, it is hereby ordered as follows:".

Sec. 2. Section 1 of Executive Order 12989, as amended, is further amended by:

(a) striking the last sentence in subsection 1(a); and

(b) striking subsection (b) and inserting in lieu thereof the following new subsections:

"(b) It is the policy of the executive branch in procuring goods and services that, to ensure the economical and efficient administration and completion of Federal Government contracts, contracting agencies may not enter into contracts with employers that do not use the best available means to confirm the work authorization of their workforce.

"(c) It is the policy of the executive branch to enforce fully the antidiscrimination provisions of the INA. Nothing in this order relieves employers of antidiscrimination obligations under section 274B of the INA (8 U.S.C. 1324b) or any other law.

"(d) All discretion under this order shall be exercised consistent with the policies set forth in this section."

Sec. 3. Section 5 of Executive Order 12989, as amended, is further amended to read as follows:

"Sec. 5. (a) Executive departments and agencies that enter into contracts shall require, as a condition of each contract, that the contractor agree to use an electronic employment eligibility verification system designated by the Secretary of Homeland Security to verify the employment eligibility of: (i) all persons hired during the contract term by the contractor to perform employment duties within the United States; and (ii) all persons assigned by the contractor to perform work within the United States on the Federal contract.

"(b) The Secretary of Homeland Security:

"(i) shall administer, maintain, and modify as necessary and appropriate the electronic employment eligibility verification system designated by the Secretary under subsection (a) of this section; and

"(ii) may establish with respect to such electronic employment verification system:

"(A) terms and conditions for use of the system; and

"(B) procedures for monitoring the use, failure to use, or improper use of the system.

"(c) The Secretary of Defense, the Administrator of General Services, and the Administrator of the National Aeronautics and Space Administration shall amend the Federal Acquisition Regulation to the extent necessary and appropriate to implement the debarment responsibility, the employment eligibility verification responsibility, and other related responsibilities assigned to heads of departments and agencies under this order.

"(d) Except to the extent otherwise specified by law or this order, the Secretary of Homeland Security and the Attorney General:

"(i) shall administer and enforce this order; and

"(ii) may, after consultation to the extent appropriate with the Secretary of Defense, the Secretary of Labor, the Administrator of General Services, the Administrator of the National Aeronautics and Space Administration, the Administrator for Federal Procurement Policy, and the heads of such other departments or agencies as may be appropriate, issue such rules, regulations, or orders, or establish such requirements, as may be necessary and appropriate to implement this order."

Sec. 4. Section 7 of Executive Order 12989, as amended, is amended by striking "respective agencies" and inserting in lieu thereof "respective departments or agencies".

Sec. 5. Section 8 of Executive Order 12989, as amended, is amended to read as follows:

"Sec. 8. (a) This order shall be implemented in a manner intended to minimize the burden on participants in the Federal procurement process.

"(b) This order shall be implemented in a manner consistent with the protection of intelligence and law enforcement sources, methods, and activities from unauthorized disclosure."

Sec. 6. Section 9 of Executive Order 12989, as amended, is amended to read as follows:

"Sec. 9. (a) Nothing in this order shall be construed to impair or otherwise affect:

(i) authority granted by law to a department or agency or the head thereof; or

(ii) functions of the Director of the Office of Management and Budget relating to budget, administrative, or legislative proposals.

"(b) This order shall be implemented consistent with applicable law and subject to the availability of appropriations.

"(c) This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity, by any party against the United States, its departments, agencies or entities, its officers, employees, or agents, or any other person."

Sec. 7. This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity, by any party against the United States, its departments, agencies or entities, its officers, employees, or agents, or any other person.

GEORGE W. BUSH

Thursday, May 27, 2010


THE WHITE HOUSE,

June 6, 2008.

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Return to this article at:

<http://www.whitehouse.gov/news/releases/2008/06/20080609-2.html>

 [CLICK HERE TO PRINT](#)



www.bb-armr.com



Models 712, 714 and CR-25 Cable Reinforced Crash Beams

- Crash tested per U.S. Navy and Department of the Army Specifications
- Hydraulic, manual or electromechanical operation
- Custom gate sizes available
- Low maintenance
- Low initial cost
- Ease of use
- Long-term durability

Solid Performance, Flexible Installation

B&B ARMR's Crash Beam Barrier Gates are engineered and designed to protect at-risk access points and prevent forced vehicle entry or exit for industrial, commercial and institutional facilities requiring medium to high security. Available in manual, hydraulic or electromechanical operating modes, the crash beam barrier gates are ideally suited for oil refineries, chemical plants, train yards, storage facilities, technical centers, nuclear facilities, embassies, military installations and government agencies.

B&B ARMR's crash beam models have a minimum roadway opening of 12 feet (3.7 m) and a maximum of 28 feet (8.5 m). The units are capable of immobilizing a 10,000 lb. (4,535.9 kg) vehicle traveling 18 mph (29.0 km/h). Basic components of the crash beam barriers include the standard vertical to horizontal arm with an energy absorption cable assembly,

hinge post, receiver/latch post, cable-reinforced crash beam and automatic controls.

When the crash beam is hit by a vehicle, the 4-inch diameter aluminum arm gives way to the cable inside, and the impact energy is absorbed as the cable stretches. When the cable is at full tension, the impact energy is then transferred to the foundation through the hinge post and the receiver/latch post of the crash beam.

B&B ARMR's crash beams have been successfully crash tested for energy absorption capacity per U.S. Navy Specifications and Department of the Army, and all are individually inspected at time of final assembly and test. For quality assurance standards, a Certification of Testing is included in the handbook for validation of meeting internal Quality Assurance Standards.

**Anti-Ram Barricades
Gate Operators
Perimeter Detection
Services Group**



Thursday, May 27, 2010

Models 712, 714 and CR-25 Cable Crash Beams

www.bb-armr.com

B&B ARMR's crash beams are available with several enhancement options to easily suit any user's needs. For extremely cold weather, the receiver/latch post may be equipped with a heater for uninterrupted operation, or an electromagnetic lock may be installed for additional security during unattended times. The manual unit, Model 714, may be raised and lowered by one person without the use of counter weights, and Model 712P is a portable vehicle barrier designed for fast installation in areas where a permanent barrier is not available.



Model 712P Installed at a temporary high security parking facility

Model 890 Surface-Mount Barrier	
Minimum Roadway Opening	12 ft (3.7 m)
Maximum Roadway Opening	25 ft (7.62 m)
Stopping Power	10,000 lbs @ 18 mph (4,535.9 kg) @ 29.0 km/hr

Model No.	Model Name	Gate Opening	Operating Time	Portable	Certification
Model 712	Hydraulic Cable Reinforced Crash Beam	12' to 25'	5-15 seconds*	No	Army Corp of Engineers
Model 712P	Portable Hydraulic Cable Reinforced Crash Beam	12' to 25'	5-15 seconds*	Yes	Army Corp of Engineers
Model 714	Manual Cable Reinforced Crash Beam	Up to 25'	Manual	No	Army Corp of Engineers
CR-25E	Electromechanical Vertical Crash Beam Barrier Gate	Up to 25'	13 seconds **	No	Army Corp of Engineers
CR-25M	Manual Vertical Crash Beam Barrier Gate	Up to 25'	13 seconds **	No	Army Corp of Engineers

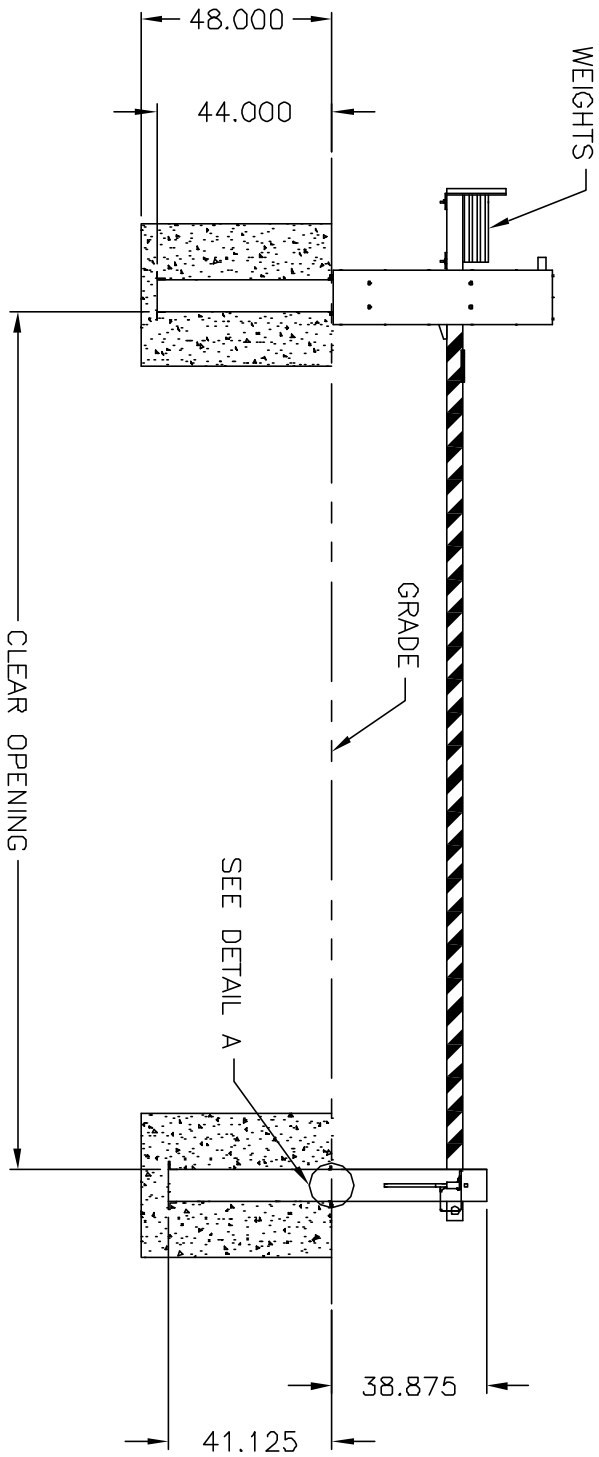
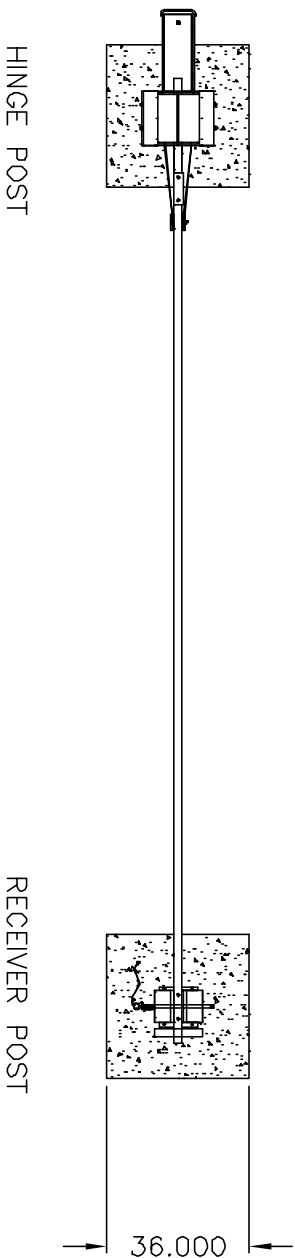
* Operating time may be increased or decreased to suit users' needs.
** Operating time depends on arm length.



B&B ARMR Corporation
2009 Chenault Drive
Suite 114
Carrollton, TX 75006

As the premier provider of high security gates and barriers for perimeter control, bridge and rail crossing, B&B ARMR Corporation is well positioned to serve our clients with unparalleled product offerings for commercial and institutional applications and customized, turnkey installation services. For further information about how B&B ARMR can provide customized, cost-effective crash rated barriers and parking control solutions, call us at 800-367-0387, or visit our website at www.bb-armr.com.

B&B ARMR products are proudly distributed by:



NOTES:

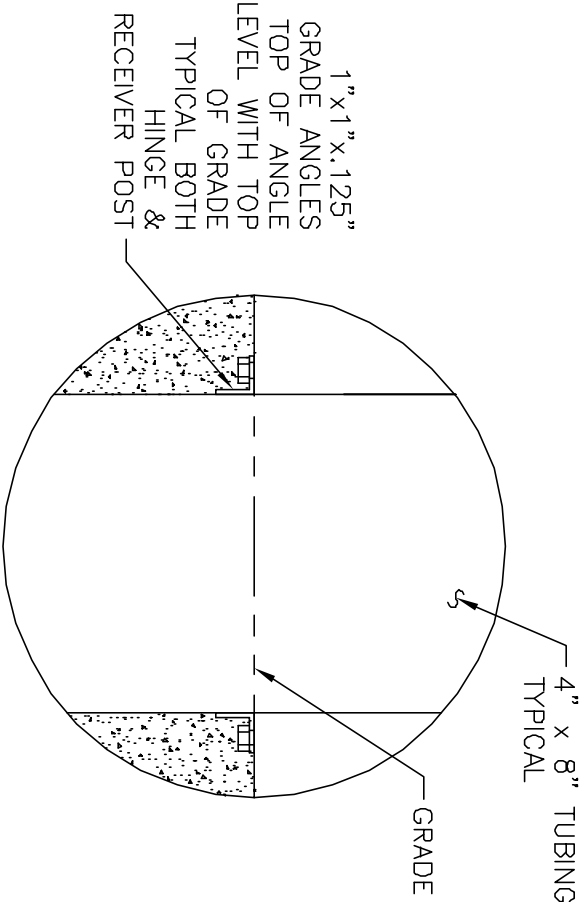
1. 714 HINGE & RECEIVER POST FOUNDATION: 36" SQUARE. 4000 PSI, #6 SCREEN, 4 SIDES.

2. THE CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS. THE CEMENT SHALL BE AS PER ASTM C150. THE MAXIMUM AGGREGATE SIZE SHALL BE 1 INCH.

3. THE FOUNDATION SHALL BE POURED ON UNDISTURBED SOIL UTILIZING THE EARTH AS THE FORM FOR THE BOTTOM AND SIDES. STANDING WATER IN THE EXCAVATION SHALL BE REMOVED PRIOR TO POURING THE FOUNDATION.

4. THE FOUNDATION DIMENSIONS SHOWN (36" x 36" x 48" DEEP) ARE CONSIDERED MINIMUM. IT IS ANTICIPATED THAT THE FOUNDATIONS WILL ROTATE AND BE DISPLACED Laterally UPON IMPACT OF THE VEHICLE. THE MAGNITUDE OF THE FOUNDATION DISPLACEMENT WILL VARY DEPENDING ON THE MASS AND VELOCITY OF THE VEHICLE AND THE LOCAL SOIL CONDITIONS. AFTER IMPACT OF THE BARRIER, THE FOUNDATIONS AND SURROUNDING SOIL SHOULD BE INSPECTED BY A COMPETENT PERSON TO DETERMINE IF REPAIR OR REPLACEMENT IS REQUIRED.

5. FOUNDATION SIZE IS BASED ON MINIMUM ALLOWABLE SOIL BEARING CAPACITY OF 1600 PSI.



DETAIL A

714 CABLE CRASH BEAM FOUNDATION

B&B ARMOR
2009 Chenault Dr. #114
Carrollton, Tx 75006
800-367-0387



B&B ARMOR Corporation
2009 Chenault Drive
Suite 114
Carrollton, TX 75006

Main: 800.367.0387
Fax: 972.385.9887

SPECIFICATION FOR MODEL CR-25M MANUAL CABLE BEAM BARRIER

PART I - GENERAL

1.1 WORK INCLUDED IN THIS SECTION

- A. Furnish labor, materials, inspections, supervision, etc., necessary for the complete installation and operation of vehicle barrier(s) as shown on the plans and specified herein. Work includes furnishing all items and accessories required or necessary for the correct operation of the vehicle barrier(s) as shown on plans and/or specified herein.

1.2 QUALITY ASSURANCE

- A. The Company shall specialize in manufacturing of the type barriers specified, with a minimum five (5) years experience.
- B. The installer shall have a minimum three (3) years installation experience of similar equipment.

1.3 SUBMITTALS

- A. Submittals shall contain sufficient plans, elevations, sections, and schematics to clearly describe the apparatus. All conduit runs, controls and similar drawings shall be included.
- B. Submittals shall include (but not necessarily limited to) the following:
 - 1. All high and low voltage conduit runs.
 - 2. Mounting dimensions and locations.
 - 3. Details of electronic equipment, electrical equipment or any other apparatus deemed necessary by the Owner or Owners representative.
- A. Installer shall provide two (2) copies of submittal packages.

1.4 INSPECTIONS

Procure all the necessary and usual inspections and certificates for all work to be installed. Deliver same to the Owner/Owners representative before final acceptance.

PART II – PRODUCTS

2.1 ELECTROMECHANICAL CABLE BEAM BARRIER GATE

A. Application

1. Barrier shall contain a rigid crash beam hinged at one end, raised and lowered by means of an electric motor and transmission. When in the down locked position the beam shall present an obstacle to approaching vehicles. Upon vehicle impact, the force shall first be absorbed by the beam assembly and then transmitted to the concrete foundations of the unit.

B. Features

1. Height of the barrier shall be 30 inches (813 mm) as measured from the roadway surface to the center line of the barrier arm.
2. The standard clear opening shall be 144 inches (3.66m) as measured inside to inside of the buttress supports. *(The Barrier can be specified with a clear opening from 120 inches (3.0m) to 300 inches (7.62m)).*
3. The hinge side assembly will be constructed of 3/8" steel plate with internal self-aligning ball ends on a single stainless steel axle allowing the aluminum beam movement in an arc up to 90 degrees. The hinge post assembly shall be designed to accept manual or hydraulic operation of the arm.
4. The receiver stanchion will be constructed of 3/8" steel plate, which is designed to direct the landing of the arm and securely contain the arm during impact.
5. The receiver and hinge shall bolt directly to a concrete pad. No above grade concrete shall be acceptable.
6. The barrier buttress supports shall be hot dipped galvanized for superior corrosion protection.
7. Barrier arm shall be fabricated from aluminum tubing and shall be furnished with red and white architectural grade reflective striping.
8. The cable shall be restrained in the arm by the use of a cast anchor post, which will act to secure the cable during impact.

C. Functional Specifications

1. Unit shall consist of a pivot and receiver housing, aluminum arm assembly with cable absorption system and a hand bar to raise / lower the arm.
 - a. A manual, pad-lockable latch shall be included to lock the free end of the crash beam securely to the receiver housing across the roadway.

2.4 PERFORMANCE

A. Testing

1. Barrier design shall have successfully passed actual full scale crash tests conducted by a qualified independent agency. Any test data other than a full scale crash test (engineered data, computer models) are not acceptable and shall not be recognized.

B. Evaluation

1. The barrier shall have been certified by the United States Navy to have a performance evaluation per Specification OR098-09-88.

C. Stopping Capacity

1. The barrier system shall be designed to impede a vehicle approaching from either direction.
 - a. The barrier shall be capable of stopping a vehicle weighing 10,000 pounds traveling at 18 mph.
 - i. The barrier shall be engineered to stop:
10,000 pound vehicle traveling at 31 mph
5,000 pound vehicle traveling at 44 mph
2,000 pound vehicle traveling at 69 mph

2.5 QUALITY ASSURANCE**A. Factory Testing**

1. Upon completion, the barrier gate will be fully tested for proper operation by manufacturer prior to shipment. A nameplate with manufacturer's name, model number, and serial number shall be located within unit.
2. All critical dimensions shall be checked for accuracy against customer approved shop drawings.

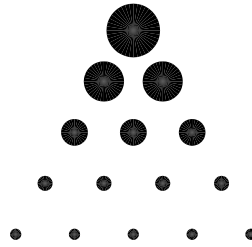
2.6 PROCUREMENT SOURCE

The hydraulic cable beam barrier system shall be model CR-25M as manufactured by **B&B ARMR Corporation (800-367-0387), 2009 Chenault Drive, Suite 114, Carrollton, TX 75006.**

PART III - EXECUTION**3.1 INSTALLATION**

- A. Installation shall be performed according to the manufacturer's instructions. Verify all component locations with contract drawings and shop drawings.
- B. Any disagreement between the Plans, Specifications, and Ordinances, must be called to same before signing of the shop drawings. After the shop drawings have been signed, the Contractor is responsible for having all work meet requirements of the governing ordinances.

Appendix BB – Palmetto State Utilities Service (PSUS) Construction Standards



PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

CONSTRUCTION STANDARDS FORT JACKSON

Date: March 16, 2009

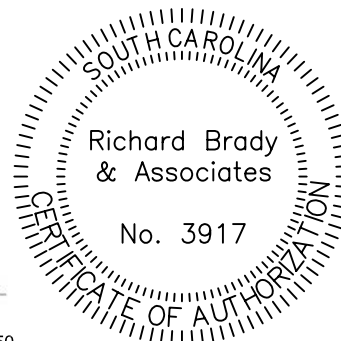
EFFECTIVE June 16, 2009

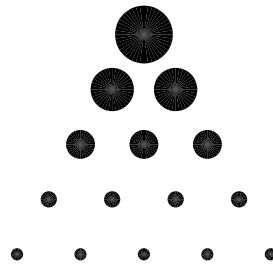


Prepared by

Richard Brady & Associates
Engineering and Construction

4824 Parkway Plaza Blvd. #250
Charlotte, NC 28217





PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

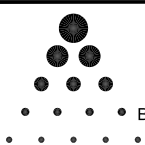
CONSTRUCTION STANDARDS - FORT JACKSON

DWG. NO.	TITLE	DWG. NO.	TITLE
	GENERAL		WATER
G0	TABLE OF CONTENTS	W1	WATER NOTES
G1	STANDARD UTILITY SYMBOLS	W2	WATER NOTES
G2	STANDARD UTILITY SYMBOLS	W3	WATER NOTES
G3	STANDARD UTILITY SYMBOLS	W4	STANDARD WATER PIPE COVER
G4	TRENCHING DETAILS (NO PAVEMENT)	W5	1" WATER METER BOX (TRAFFIC)
G5	TRENCHING DETAILS (PAVEMENT)	W6	1" WATER METER COVER (TRAFFIC)
G6	TRENCHING TABLES	W7	1" WATER METER BOX (NON-TRAFFIC)
G7	PIPE SEPARATION DETAIL	W8	1" WATER METER COVER (NON-TRAFFIC)
G8	BOLLARD DETAIL	W9	VALVE BOX COVER
G9	THRUST BLOCK SIZING DETAIL	W10	VALVE BOX
G10	THRUST BLOCKING LOCATION DETAIL	W11	FIRE HYDRANT LOCATIONS
G11	CARRIER PIPE INSTALLATION W/CASING INSULATORS	W12	FIRE HYDRANT INSTALLATION
G12	GENERAL PAVEMENT REPAIR NOTE	W13	GATE VALVE DETAIL
G13	PERMANENT PAVEMENT PATCH	W14	CONCRETE BOXES W/BILCO HATCH
G14	ADJUSTABLE PIPE SUPPORT	W15	BLOWOFF ASSEMBLY
G15	CHAIN LINK FENCE & GATE	W16	2" AIR RELEASE VALVE
G16	STREAM CROSSING PIPE ENCASEMENT	W17	AIR RELEASE VALVE LOCATIONS
G17	STANDARD LOCATIONS FOR WATER & SEWER	W18	4" AUTO AIR RELEASE & AIR/VAC VALVE
	SEWER	W19	POST INDICATING VALVE
S1	SEWER NOTES	W20	2" PRESSURE RELIEF VALVE
S2	24" MANHOLE RING AND COVER	W21	TAPPING SADDLE AND VALVE
S3	48" SEWER MANHOLE	W22	24" MANHOLE RING AND COVER
S4	MANHOLE PENETRATION	W23	SAMPLING STATION
S5	SEWER SERVICE LATERAL	W24	3/4" OR 1" SERVICE
S6	STANDARD SEWER PIPE COVER	W25	2" SERVICE
S7	VCP SANITARY SEWER REPAIR	W26	CROSS CONNECTION CONTROL NOTES
S8	LIFT STATION SITE LAYOUT	W27	3" - 10" BACKFLOW PREVENTER W/OUT METER
S9	LIFT STATION PLAN	W28	3" - 10" BACKFLOW PREVENTER WITH METER
S10	LIFT STATION SECTION	W29	3" - 10" METER W/OUT BACKFLOW PREVENTER
S11	EMERGENCY CONNECTION	W30	ALL WEATHER ENCLOSURE
S12	SEWER GRINDER UNIT (SECTION A-A)	W31	ENCLOSURE ANCHOR
S13	SEWER GRINDER UNIT (SECTION B-B)	W32	45° MECHANICAL JOINT UTILITY INVERT
S14	ELECTRICAL RISER	W33	VALVE ANCHOR
S15	LIFT STATION NOTES	W34	STABILIZER UNIT
S16	SEWER POINT REPAIR	W35	RESTRAINT DETAIL (DUCTILE IRON PIPE)
S17	SEWER LATERAL ABANDONMENT	W36	WATER SERVICE ABANDONMENT
S18	OUTSIDE DROP MANHOLE		SPECIFICATIONS
			TECHNICAL PIPELINE INSTALLATION SPECS
			POTABLE WATER MATERIAL GUIDELINES

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

COVER



PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	UPDATE TO REFLECT SHEET CHANGES	SFM	3-16-09	

SCALE:

NTS

Thursday, May 27, 2010

G0

PROPERTY LINE AND RIGHT OF WAY LINE	
CENTER LINE	
EASEMENT LINE	
EXISTING CURB AND GUTTER	
PROPOSED CURB AND GUTTER	
CHAIN LINK FENCE	
BARBED WIRE FENCE	
BURIED TELEPHONE	
BURIED ELECTRICAL	
BURIED GAS MAIN	
STORM DRAIN	
TV CABLE	
OVERHEAD TELEPHONE	
OVERHEAD ELECTRIC	
MATCH LINE	
RAILROAD	
SLOPE	
NATURAL GROUND	
ROCK/GRAVEL	
CONCRETE	
HMAC	
SOIL BORING LOCATION/BORING No.	
CATHODIC PROTECTION TEST STATION	
BENCHMARK	
NORTH ARROW AND SCALE (SET SCALE TO 2-INCHES @ FULL SIZE)	

WATER MAIN

WATER UNDER CONSTRUCTION

WELL FLOW LINES

WATER REUSE LINE

SEWER MAIN

SEWER UNDER CONSTRUCTION

EXISTING FORCE MAIN

LINE CROSSES ABOVE

LINE CROSSES BELOW

PROPOSED WATER MAIN

PROPOSED SEWER MAIN

PROPOSED FORCE MAIN

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: STANDARD UTILITY SYMBOLS



PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS						
ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
		ORIGINAL ISSUE DATE		6-11-08		
	1	NO CHANGES	SFM	3-16-09		

SCALE:

NTS

Thursday, May 27, 2010

G2

GATE VALVE	
BUTTERFLY VALVE	
BALL VALVE (NORMALLY OPEN)	
BALL VALVE (NORMALLY CLOSED)	
CHECK VALVE	
PLUG VALVE (NORMALLY OPEN)	
PLUG VALVE (NORMALLY CLOSED)	
COUPLING	
REDUCER	
TEE	
CROSS	
BEND	
VERTICAL BEND	
PLUG FOR FUTURE CONNECTION	
WTR/SWR SERVICE CONNECTION	
CASING AND CARRIER PIPE	
EXISTING MANHOLE WITH FLOW ARROW	
PROPOSED MANHOLE WITH FLOW ARROW	
DROP MANHOLE	
MANHOLE STUB OUT	
FIRE HYDRANT	
FIRE HYDRANT	
METER BOX	

GENERAL NOTES:

1. SHEETING, SHORING, OR UNDERPINNING SHALL BE INSTALLED TO A MINIMUM DEPTH OF 5 FEET BELOW PIPE BEDDING OR AS REQUIRED TO STABILIZE ADJACENT STRUCTURES AND PIPELINES. THE ADEQUACY OF ALL SHEETING, SHORING AND UNDERPINNING IS THE RESPONSIBILITY OF THE CONTRACTOR. SHEETING AND SHORING SHALL BE REMOVED EXCEPT AS OTHERWISE SHOWN OR SPECIFIED.
2. TRENCH SAFETY SYSTEM / PLAN SHALL BE DESIGNED BY A SOUTH CAROLINA P.E.

KEY NOTES:

- 1 FOR BEDDING SEE TABLE A ON SHEET G6.
- 2 INITIAL BACKFILL SEE TABLE A ON SHEET G6.
- 3 SUBSEQUENT BACKFILL SEE TABLE A ON SHEET G6.

TYPICAL TRENCH LIMITATIONS:

D, IN.	W MIN, IN.	Bd MIN, IN.	Bt MIN. IN.
PIPE DIAM.	6	Bc+12	6

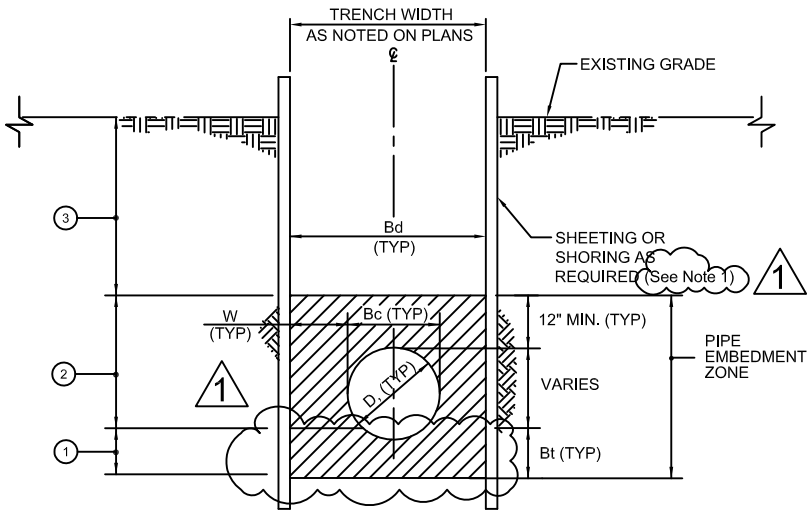
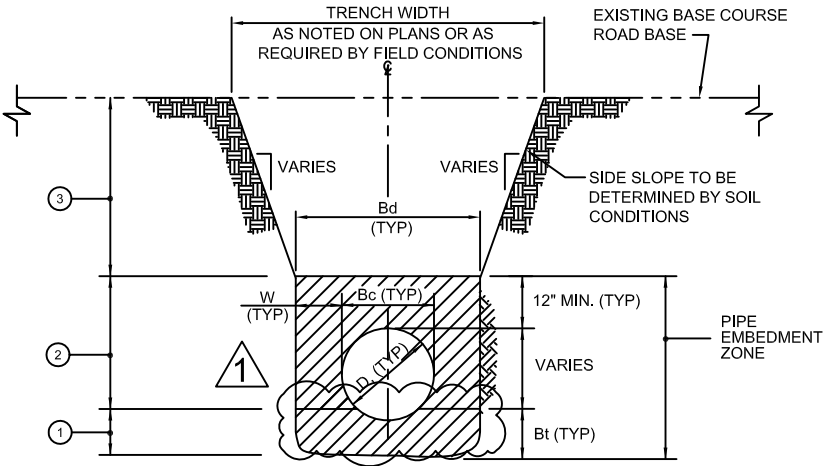
Bd = WIDTH FROM BOTTOM TO 12" ABOVE PIPE

W = CLEARANCE TO WALL, EXCLUDING SHEETING, I.E. TO EARTH

D = PIPE INSIDE DIAMETER, I.E. NOMINAL PIPE SIZE


Bc = PIPE OUTSIDE DIAMETER

Bt = DEPTH OF BEDDING FROM INVERT OF PIPE TO BOTTOM OF TRENCH



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: TRENCHING DETAILS (NO PAVEMENT)



PALMETTO STATE UTILITY SERVICES, INC.
A Subsidiary of American States Utility Services, Inc.
Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

ZONE		REV.	DESCRIPTION	BY	DATE	APP.
			ORIGINAL ISSUE DATE		6-11-08	
		1	REVISED BEDDING SPECIFICATION	SFM	3-16-09	

SCALE:
NTS

DRAWING NUMBER
G4

Thursday, May 27, 2010

1. NEW ASPHALT PAVEMENT SHALL MATCH EXISTING THICKNESS (2" MINIMUM).
2. CONTRACTOR SHALL REPLACE ENTIRE WIDTH OF PAVEMENT IF MORE THAN HALF OF THE EXISTING PAVED STREET IS DAMAGED.
3. BACKFILL WITH CLASS C BACKFILL MATERIAL PER INITIAL AND SUBSEQUENT BACKFILL KEY NOTES 2 AND 3.
4. REPLACE AND COMPACT THE 12 INCH BASE COURSE ROAD BASE TO 95% DENSITY.

KEY NOTES:

- 1 FOR BEDDING SEE TABLE A ON SHEET G6.
- 2 INITIAL BACKFILL SEE TABLE A ON SHEET G6.
- 3 SUBSEQUENT BACKFILL SEE TABLE A ON SHEET G6.

TYPICAL TRENCH LIMITATIONS:

D, IN.	W MIN, IN.	Bd MIN, IN.	Bt MIN, IN.
PIPE DIAM.	6	Bc+12	6

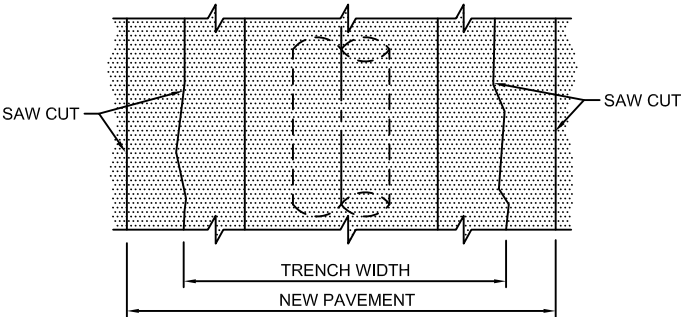
Bd = WIDTH FROM BOTTOM TO 12" ABOVE PIPE

W = CLEARANCE TO WALL, EXCLUDING SHEETING, I.E. TO EARTH

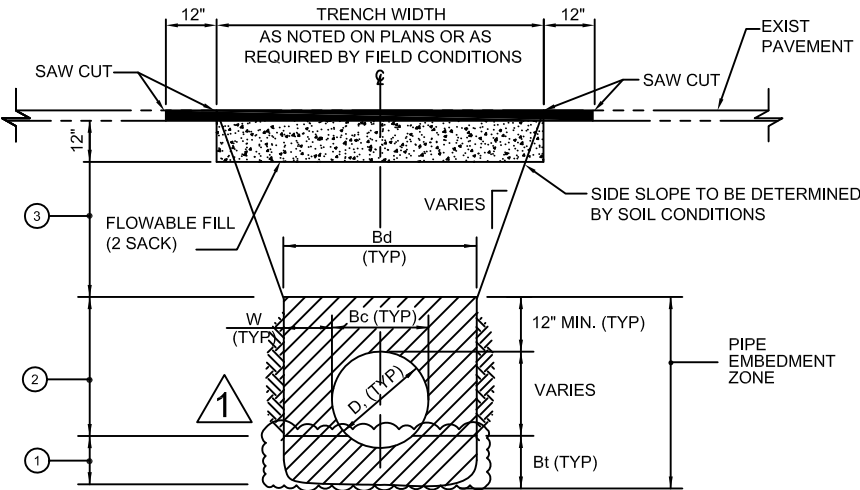
D = PIPE INSIDE DIAMETER, I.E. NOMINAL PIPE SIZE

Bc = PIPE OUTSIDE DIAMETER

Bt = DEPTH OF BEDDING FROM INVERT OF PIPE TO BOTTOM OF TRENCH



PLAN



SECTION

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: TRENCHING DETAILS (PAVEMENT)

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Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

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		ORIGINAL ISSUE DATE		6-11-08	
	1	REVISED BEDDING SPECIFICATION	SFM	3-16-09	

SCALE:
NTS

DATE: Thursday, May 27, 2010
G5

TRENCHING TABLES

A. TABLE A, Fill Classifications

Material type	Maximum uncompressed layer depth, inches	Minimum relative compaction percent	General application
B	8	95	Structural (select) fill (per ASTM D-1557 modified proctor)
C	8	95	Subsequent pipeline backfill and backfill within 8 feet of structural foundations (per ASTM D-1557 modified proctor)
D	-	-	Structural granular base and slab on grade
F	12	95	Pipe bedding and initial backfill

B. TYPE B:



Type B material shall be a select granular material free from organic matter and of such size and gradation that the specified compaction can be readily attained. Material shall have a sand equivalent value determined in accordance with ASTM D2419 of not less than 20 and shall conform to the following gradation:

U.S. standard sieve size	Percent by weight passing
3 inch	100
¾ inch	70-100
No. 4	40-100
No. 200	5-35

The coefficient of uniformity shall be 3 or greater. The plasticity index of the material, as determined in accordance with ASTM D 4318, shall not exceed 15 and the material shall have a liquid limit less than 40.

The material may be an imported quarry waste, clean natural sand or gravel, select trench excavation or a mixture thereof. The fill material shall be free from roots, grass, other vegetable matter, clay lump, rocks larger than 3 (three) inches in any dimension, or other deleterious materials.

C. TYPE C:

Type C material shall be unclassified material which is free from peat, wood, roots, bark, debris, garbage, rubbish or other extraneous material. The maximum size of stone shall not exceed 2 inches. If the material excavated from the site meets these requirements, it may be classified as Type C and shall conform to the following gradation:

U.S. standard sieve size	Percent by weight passing
2 inch	100
No. 200	0 - 45

The plasticity index of the material, as determined in accordance with ASTM D 4318, shall not exceed 15.

D. TYPE D:

Type D material shall be used for prepared subgrade under slabs and mat-type foundations where indicated on the drawings. Granular base shall meet the following grading requirements as determined in accordance with ASTM D 422:

U.S. standard sieve size	Percent by weight passing (by dry weight)
1 inch	100
¾ inch	85 - 100
No. 4	45 - 95
No. 200	0 - 8

The granular base should have a plasticity index of no greater than 12 when tested in accordance with ASTM D 4318. The coarse aggregate should have a percent of wear, when subjected to the Los Angeles abrasion test (ASTM C 131), of no greater than 50. Granular base should be compacted to at least 95 percent of maximum dry density in accordance with ASTM D 1557.

F. TYPE F:

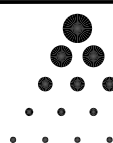
Type F material shall be Sand Equivalence (SE) of 30 or better.



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

TRENCHING TABLES



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Thursday, May 27, 2010

G6

GENERAL NOTE:

1. SEPARATION DISTANCE SHALL COMPLY WITH STATE REGULATIONS.
2. ALL PIPES OTHER THAN SEWER MUST HAVE AT LEAST 12" OF SEPARATION.

CONSTRUCTION NOTES:

1

SEPARATION DISTANCE SHALL BE DETERMINED ACCORDING TO THE FOLLOWING CONDITIONS.

CASE I. WATER MAIN PARALLEL TO SEWER MAIN

- a. LOCATION - WATER ABOVE SEWER
- b. SEWER MATERIALS - DI OR PVC.

CASE II. SEWER MAIN PARALLEL WATER MAIN

- a. LOCATION - WATER BELOW SEWER
- b. SEWER MATERIALS - DI.

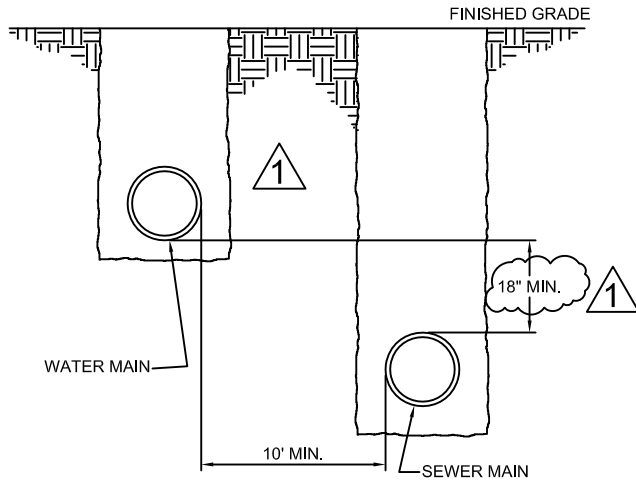
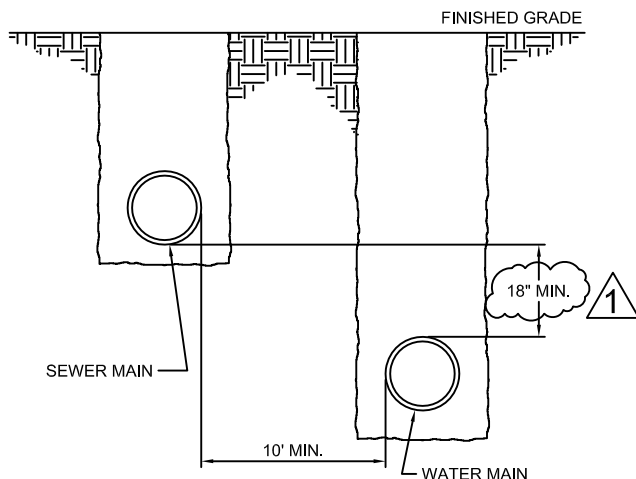
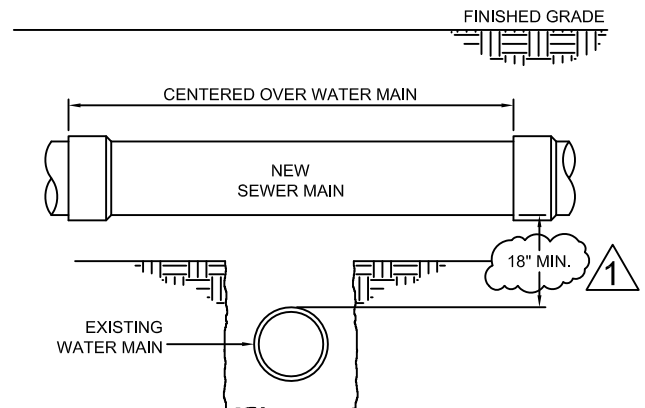
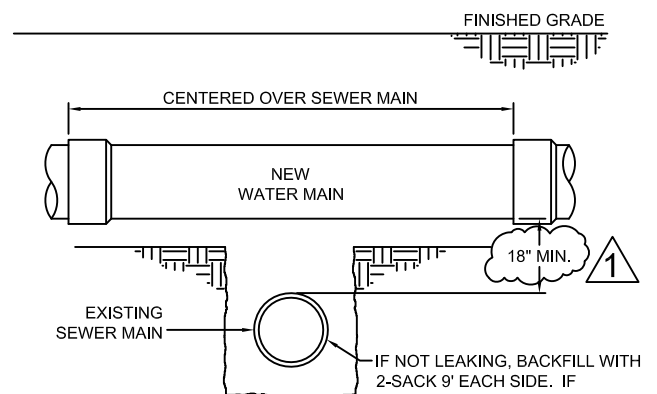
CASE III. SEWER MAIN CROSSING WATER MAIN

- a. LOCATION - WATER BELOW SEWER
- b. SEWER MATERIALS - DI OR PVC, MINIMUM PRESSURE RATING OF 150 PSI.

CASE IV. WATER MAIN CROSSING SEWER MAIN

- a. LOCATION - SEWER BELOW WATER
- b. SEWER MATERIALS - DI OR PVC, MINIMUM PRESSURE RATING OF 150 PSI, IF REPLACED.

IF 10' HORIZONTAL SEPARATION FOR CASE I & II CAN NOT BE ACHIEVED, THEN 4' HORIZONTAL SEPARATION WILL BE PERMITTED. SEWER MAIN WILL HAVE TO BE 150 PSI RATED UNTIL 10' SEPARATION IS ACHIEVED AGAIN.

**CASE I****CASE II****CASE III****CASE IV**

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

PIPE SEPARATION DETAIL

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 • • • • • Tel: (803) 790-7288 Fax: (803) 787-2054

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	1	REVISED DISTANCES AND MATERIALS	SFM	3-16-09	
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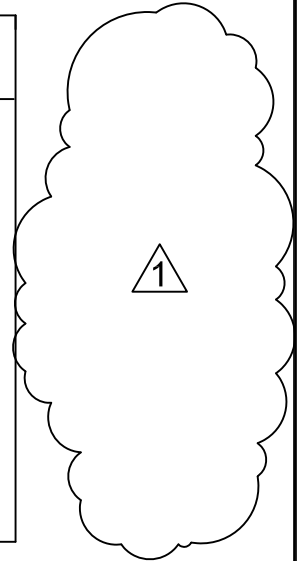
Thursday, May 27, 2010

HORIZONTAL THRUST (LBS)
MINIMUM BEARING AREA (SQUARE FEET)

FITTING SIZE	22 1/2 ° BEND		45 °BEND		90 °BEND		TEE OR DEAD END	
	THRUST	AREA	THRUST	AREA	THRUST	AREA	THRUST	AREA
4"	1,450	2	2,800	2	5,200	3	3,700	2
6"	2,900	2	5,800	3	10,700	6	7,600	4
8"	5,100	3	10,100	5	18,600	10	13,200	7
10"	8,300	5	16,500	8	30,400	16	21,500	12
12"	11,900	6	23,400	12	43,300	21	30,600	16
14"	16,100	8	31,800	16	58,700	30	41,500	21
16"	20,900	10	41,200	21	76,000	38	53,800	27

TYPICAL DIMENSIONS

BEARING AREA SQUARE, FEET	HORIZONTAL FEET	VERTICAL FEET	MIN DISTANCE FEET
2	2	1.5	1
3	2	1.5	1
4	2	2	1
5	2.5	2	1
6	3	2	1.25
7	3.5	2	1.5
8	4	2	1.7
10	5	2	2
16	5.3	3	2.25
21	6.4	3.3	2.75
27	7.2	3.75	3
30	7.5	4	3.5
38	9	4.5	3.5



NOTES:

- THRUST BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.
- MINIMUM VOLUME OF THRUST BLOCK IS 3 CUBIC FEET.
- THE ABOVE TABLES ARE BASED ON A SOIL HAVING A BEARING CAPACITY OF 2000 PSF. TO DETERMINE THE REQUIRED BEARING AREA FOR OTHER SOILS, MULTIPLY THE BEARING AREA BY THE FOLLOWING FACTORS.

MUCK	0 PSF	NOT ACCEPTABLE
SOFT CLAY	1000 PSF	MULTIPLY BEARING AREA BY 2.0
SAND	2000 PSF	NO ADJUSTMENT
SAND AND GRAVEL	3000 PSF	MULTIPLY BEARING AREA BY 0.66
CEMENTED SAND AND GRAVEL	4000 PSF	MULTIPLY BEARING AREA BY 0.5

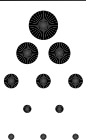
- THE ABOVE TABLES ARE BASED ON A TEST PRESSURE OF 200 PSI. FOR OTHER PRESSURES ADJUST PROPORTIONATELY.

- PORTLAND CEMENT CONCRETE SHALL PROVIDE $F'_c = 3,000 \text{ PSI @ 28 DAYS}$.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

THRUST BLOCK SIZING DETAIL



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REVISIONS

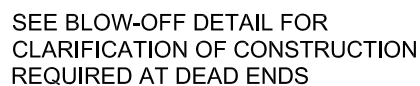
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	1	REMOVED THRUST BLOCK DETAIL	SFM	3-16-09	

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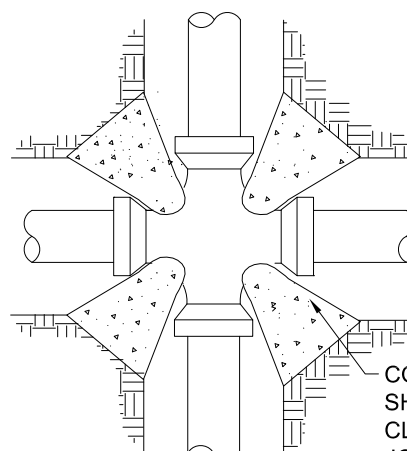
G9



DEAD END



ALL BEARING
SURFACES
SHALL BE AGAINST
UNDISTURBED
GROUND (TYP.)



CONCRETE SHALL BE KEPT CLEAR OF PIPE JOINTS(TYP.)

CROSS

TITLE: THRUST BLOCK LOCATION DETAIL



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G10


Thursday, May 27, 2010

1. MILLING EQUIPMENT USED IN LIEU OF SAW CUTTING AND PAVEMENT DISPOSAL SHALL BE APPROVED BY THE ENGINEER. PAVEMENT REMOVAL AND MILLING OPERATIONS ARE LIMITED TO 3000' PER SEWER MAIN CREW AND REQUIRE THE MILLINGS TO BE PLACED IN THE MILLED AREA AND COMPACTED TO ACT AS A TEMPORARY SURFACE FOR TRAFFIC. THE MILLINGS SURFACE ALONG AN UNDISTURBED TRENCH SHALL BE MAINTAINED AS DIRECTED BY THE ENGINEER. (NO SEPARATE PAYMENT)
2. CONTRACTOR SHALL SAW CUT OR MILL ALL PAVEMENTS STRAIGHT AND TRUE PRIOR TO TRENCHING. CONTRACTOR SHALL SAW CUT PATCH AREAS AGAIN IMMEDIATELY PRIOR TO PATCH PAVING. THE FINAL SAW CUT FOR PATCHES SHALL BE STRAIGHT WITH A NEAT SQUARE EDGE AND OF UNIFORM WIDTH PARALLEL WITH THE EDGE OF PAVEMENT/CURB LINE. NO JAGGED CUTS SHALL BE ACCEPTED. ADDITIONAL WIDTHS REQUIRED SHALL BE AT THE CONTRACTORS
3. SANITARY SEWER MAINS AND LATERALS SHALL BE PAID FOR BASED ON A 10' AND 6' WIDE PATCH RESPECTIVELY. WATER MAIN AND LATERAL PATCHES SHALL BE PAID FOR BASED ON A 4' WIDTH.
4. CONTRACTOR SHALL SWEEP STREETS AND PROVIDE DUST CONTROL AT ALL TIMES VIA WATER TRUCK, BROOMS, COMPACTORS, ETC. DEBRIS FROM SWEEPING OPERATIONS SHALL NOT BE DIRECTED TOWARD YARDS AND SHALL BE REMOVED AND DISPOSED OF. CLEAN UP OF DEBRIS, TRASH, EXCESS MATERIALS ETC. SHALL BE PERFORMED DAILY IN EACH PROJECT CONSTRUCTION AREA (NO SEPARATE PAYMENT).
5. THE DAY PRIOR TO PATCH PAVING OPERATIONS BEGIN THE CONTRACTOR MAY (A) REMOVE SOIL IN PATCH AREA TO SUB GRADE ON THE MAIN LINE TRENCH ON ANY CUL-DE-SAC'S LESS THAN 300 FEET IN LENGTH. (B) THE MAIN LINE TRENCH AND SEWER LATERALS ON THROUGH STREETS MAY BE CUT DOWN TO SUB GRADE ON ONE SIDE OF THE STREET ONLY.
6. THE MORNING THAT PAVING OPERATIONS BEGIN, THE CONTRACTOR MAY REMOVE THE REMAINING SOIL FROM THE MAIN LINE TRENCHES AND THE LATERALS TO SUB GRADE ON THE OTHER SIDE OF THE STREET. REMOVAL SHALL NOT EXCEED THE DAILY PATCH PAVING PRODUCTION.
7. ANY TRENCHES OPENED FOR PAVING SHALL BE PAVED BY THE END OF THE SAME DAY. IF WEATHER CONDITIONS CHANGE OR EQUIPMENT BREAKS DOWN, OR ANY OTHER OCCURRENCE THAT STOPS THE PAVING OPERATIONS OCCURS, ALL OPEN TRENCHES SHALL BE BACK FILLED BY THE END OF THE DAY WITH AGGREGATE BASE COURSE, AT THE CONTRACTOR'S EXPENSE.
8. THE CONTRACTOR SHALL PATCH PAVE SERVICE LATERALS ON THE SAME DAY THAT MAIN LINE TRENCHES ARE PAVED. LATERAL SHALL BE PATCHED ON BOTH SIDES OF THE STREET AS PAVING PROGRESSES.
9. THE CONTRACTOR SHALL BE REQUIRED TO IMPLEMENT PROPER TRAFFIC CONTROL PROVISIONS AND ANY DEVICES REQUIRED TO IDENTIFY OBSTRUCTIONS OR HAZARDS WITHIN THE RIGHT-OF-WAY TO INCLUDE REFLECTIVE CONES AT EACH SERVICE LATERAL REFLECTIVE BARRELS ON RAISED MANHOLES, ETC.
10. CONTRACTOR SHALL COMPLETE PATCH PAVING EACH 3000 LF INCREMENTAL SECTION PRIOR TO MOVING TO A NEW 3000 FOOT SECTION.
11. AT NO TIME SHALL THE CONTRACTOR LEAVE UNATTENDED AND/OR IMPROPERLY SECURE MAIN OR LATERAL TRENCHES WITH A VERTICAL ELEVATION DROP EXCEEDING 1" FROM EXISTING ASPHALT TO TRENCH SUB GRADE UNATTENDED OR OVERNIGHT.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

GENERAL PAVEMENT REPAIR NOTES

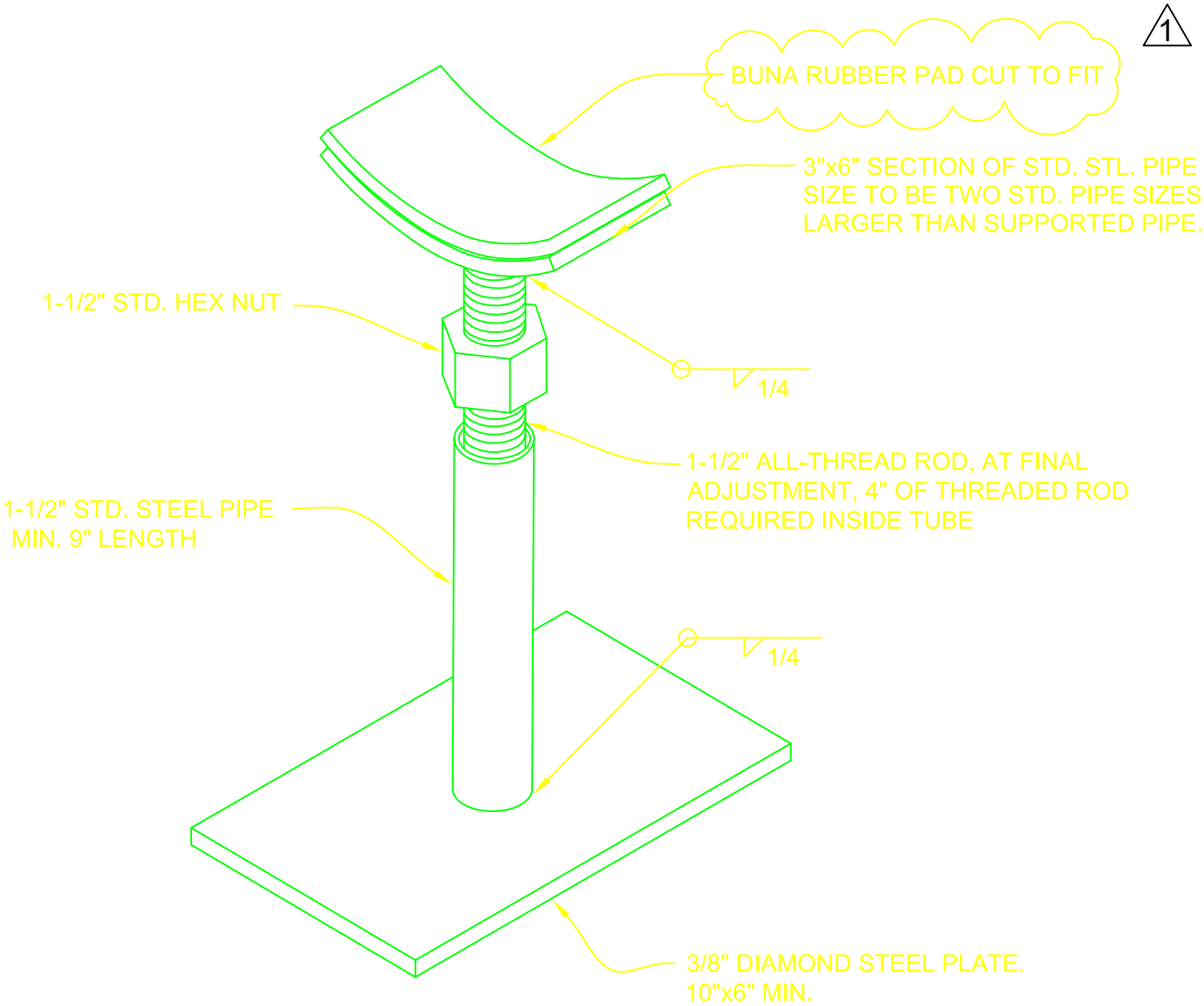
 PALMETTO STATE UTILITY SERVICES, INC. A Subsidiary of American States Utility Services, Inc. Building 2576, Essayons Way Fort Jackson, SC 29207 Tel: (803) 790-7288 Fax: (803) 787-2054	REVISIONS						SCALE:
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5. AFTER UTILITY IS INSTALLED AND TESTED AND THE EXCESS BASE MATERIAL REMOVED (APPROX. 2") CONTRACTOR SHALL AGAIN SAWCUT EXISTING PAVEMENT STRAIGHT AND TRUE IMMEDIATELY PRIOR TO PAVING AS NOTED ABOVE.
6. MILLING OPERATIONS SHALL BE LIMITED TO 1800 FEET PER MAIN LINE CREW NOT TO EXCEED 3000 FEET IN TOTAL OF DISTURBED ROADWAY FOR THE ENTIRE PROJECT AT ONE TIME. CONTRACTOR SHALL PATCH PAVE DISTURBED AREA OF ROADWAY PRIOR TO DISTURBING ADDITIONAL ROADWAY.
7. AT NO TIME SHALL THE TRENCH BE LEFT UNATTENDED WITH A VERTICAL DROP GREATER THAN 1 INCH FROM ASPHALT SURFACE TO TOP OF BACKFILLED TRENCH.
8. IF PAVEMENT SETTLEMENT OCCURS WITHIN 1 YEAR, THE CONTRACTOR SHALL REPATCH AT NO ADDITIONAL EXPENSE TO PSUS.
9. FULL DEPTH ASPHALT PATCH TO MATCH EXISTING ASPHALT THICKNESS ON STATE MAINTAINED ROADS WILL BE REQUIRED. SCDOT REQUIRES PATCH PAVING SAME DAY AS REMOVAL.
10. TEST FOR DENSITY OF COMPACTION MAY BE MADE AT THE OPTION OF THE ENGINEER AND DEFICIENCIES SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO PSUS. THE ENGINEER MAY HAVE COMPACTION TEST PERFORMED AFTER THE BACKFILL IS COMPLETE. CONTRACTOR SHALL BE REQUIRED TO EXCAVATE TO VARIOUS ELEVATIONS FOR DENSITY TESTING EXCAVATION, BACKFILL AND RECOMPACTION SHALL BE PERFORMED AT NO ADDITIONAL COSTS TO PSUS.

G13

Thursday, May 27, 2010
C13



GENERAL NOTES:

1. PIPE SUPPORTS SHALL BE PAINTED AND COATED IN ACCORDANCE WITH THE STANDARD PAINT SPECIFICATIONS. COLOR DESERT SAND (TAN).
2. ALL THREADED AREAS SHALL BE COATED WITH "NEVER-SEIZE" OR OTHER EQUIVALENT ANTI-RUST LUBRICANT.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON


TITLE:

ADJUSTABLE PIPE SUPPORT

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Building 2576, Essayons Way Fort Jackson, SC 29207
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G14

STANDARD CONSTRUCTION DRAWING - FORT JACKSON					TITLE: CHAIN LINK FENCE & GATE				
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	ZONE	REV.	DESCRIPTION	BY	DATE	APP.	NTS		
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							Thursday, May 27, 2010		
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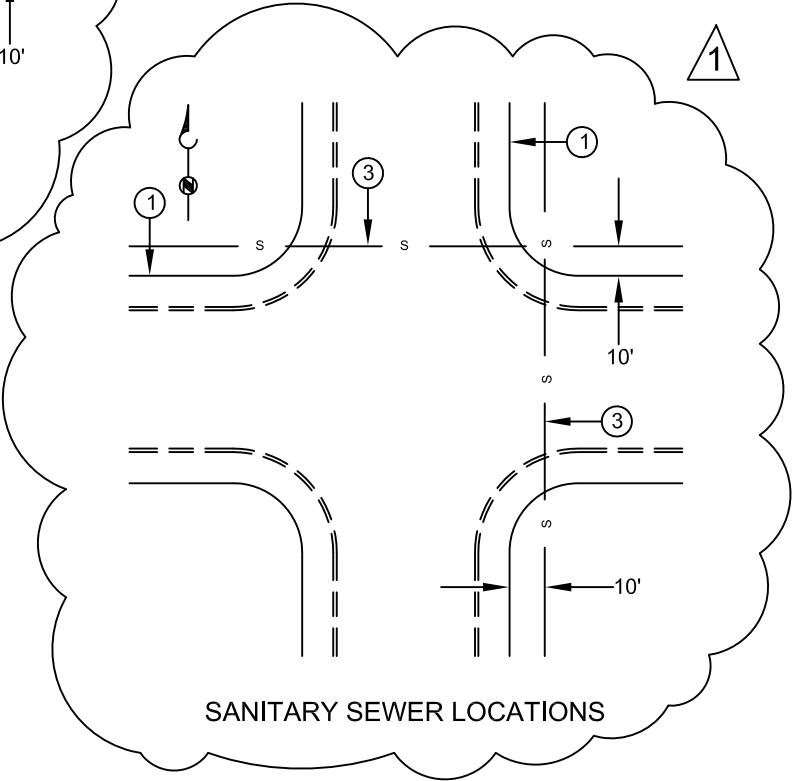
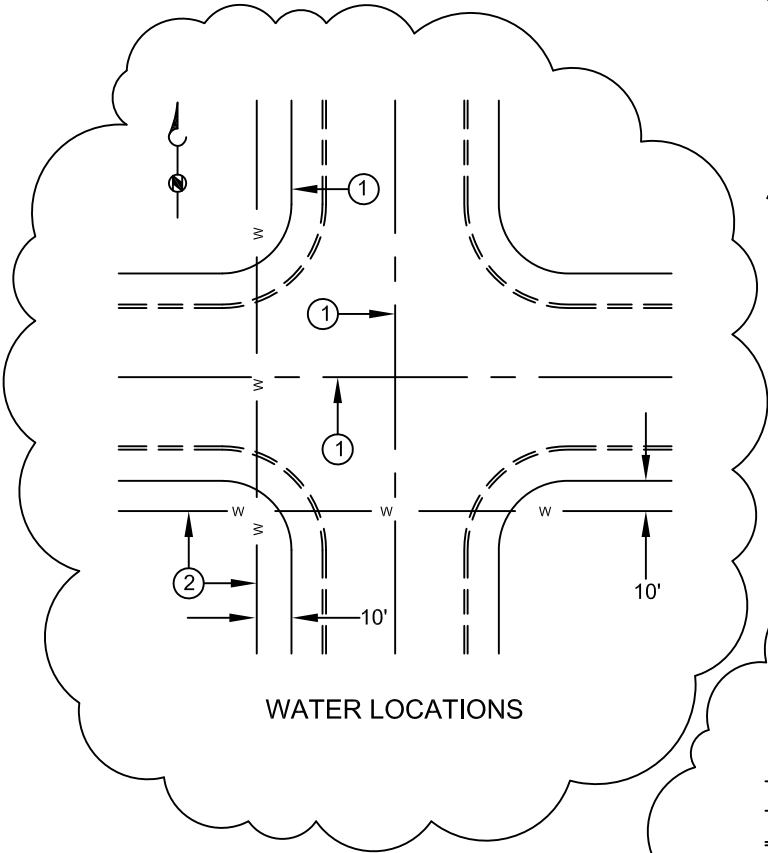
KEY NOTES:

- 1
- 1

REFERENCE LINE SHALL BE EDGE OF PAVEMENT OR TOP FRONT FACE OF GUTTER.
- 2

WATER EXTENSIONS SHALL BE LOCATED ON HIGHER ELEVATIONS SIDE OF STREETS OR ALLEYS.
- 3

SEWER EXTENSIONS SHALL BE LOCATED ON LOWER ELEVATION SIDE OF STREETS OR ALLEYS.



THIS SHOULD BE USED AS A GENERAL GUIDE. SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (SCDHES) REGULATIONS R.61-67 SHALL BE USED FOR SPECIFIC DESIGN CRITERIA. THE INFORMATION REQUIRED BY R.61-67 INCLUDES THE APPROPRIATE SECTION FOR REFERENCE.

A. GENERAL REQUIREMENTS:

- 1. CONSTRUCTION SPECIFICATIONS MUST BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER. THE SPECIFICATIONS SHOULD INCLUDE THE ENGINEERING FIRM'S CORPORATE SEAL ALONG WITH THE SEAL AND SIGNATURE OF ALL ENGINEERS OF THE FIRM UTILIZING THESE SPECIFICATIONS. (67.100.E.2)
- 2. ALL STANDARDS CITED IN THE TEXT REFER TO THE LATEST REVISION OF THAT STANDARD UNDER THE SAME SPECIFICATION NUMBER OR TO SUPERSEDING SPECIFICATIONS UNDER A NEW NUMBER.

B. MATERIALS REQUIREMENTS:

- 1. GRAVITY SEWER LINE MATERIALS SHALL CONFORM TO THE FOLLOWING, AT A MINIMUM: (67.300.A.17)
 - a. PVC PIPE; INSTALLATION: ASTM D-3033, D-3034 OR F-789-82; ASTM D-2321.
 - b. DIP: ASTM A-746 OR ANSI A21.50 & ANSI 21.51 OR AWWA C150 & AWWA C151.
 - c. CIP AND JOINTS: ANSI A21.1, A21.6, A21.8, A21.10, AND/OR A21.11.
- 2. FORCE MAIN MATERIALS SHALL CONFORM TO THE FOLLOWING, AT A MINIMUM: (67.300.A.17)
 - a. PVC FORCE MAIN; INSTALLATION: ASTM D-2241; ASTM D-2321 OR ASTM D-2774.
 - b. CIP AND DIP FORCE MAIN; INSTALLATION: ASTM A-377; AWWA C-600.
 - 3. PRECAST CONCRETE MANHOLES SHALL CONFORM TO ASTM C-478, AT A MINIMUM.

C. INSTALLATION REQUIREMENTS:

- 1. ALL SEWERS SHALL BE CONSTRUCTED WITH A MINIMUM OF THREE (3) FEET OF COVER, UNLESS JUSTIFIED BY THE APPLICANT AND APPROVED BY THE DEPARTMENT (E.G., USE OF DUCTILE IRON PIPE MAY HAVE COVER LESS THAN THREE (3) FEET). (67.300.A.12)
- 2. SEPARATION OF SEWERS AND WATER MAINS: (67.300.A.14.(A)-(F))
 - a. POTABLE WATER SUPPLY INTERCONNECTIONS. THERE SHALL BE NO PHYSICAL CONNECTIONS BETWEEN A PUBLIC OR PRIVATE POTABLE WATER SUPPLY SYSTEM AND A SEWER, OR APPURTENANCE THERETO WHICH MAY PERMIT THE PASSAGE OF ANY SEWAGE OR POLLUTED WATER INTO THE POTABLE SUPPLY. NO POTABLE WATER PIPE SHALL PASS THROUGH OR COME INTO CONTACT WITH ANY PART OF A SEWER MANHOLE.
 - b. HORIZONTAL AND VERTICAL SEPARATION FROM POTABLE WATER MAINS. SEWERS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED POTABLE WATER MAIN. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN A 10 FOOT SEPARATION, THE DEPARTMENT MAY ALLOW DEVIATION ON A CASE-BY-CASE BASIS, IF SUPPORTED BY DATA FROM THE DESIGN ENGINEER. SUCH DEVIATION MAY ALLOW INSTALLATION OF THE SEWER CLOSER TO A POTABLE WATER MAIN, PROVIDED THAT THE POTABLE WATER MAIN IS IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER AND AT AN ELEVATION SO THE BOTTOM OF THE POTABLE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.
 - c. CROSSINGS. SEWERS CROSSING POTABLE WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL SEPARATION OF 18 INCHES BETWEEN THE OUTSIDE OF THE POTABLE WATER MAIN AND THE OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHERE THE POTABLE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER. WHENEVER POSSIBLE, THE POTABLE WATER MAIN SHALL BE LOCATED ABOVE THE SEWER MAIN. WHERE A NEW SEWER LINE CROSSES A NEW POTABLE WATER MAIN, A FULL LENGTH OF PIPE SHALL BE USED FOR BOTH THE SEWER LINE AND POTABLE WATER MAIN AND THE CROSSING SHALL BE ARRANGED SO THAT THE JOINTS OF EACH LINE SHALL BE AS FAR AS POSSIBLE FROM THE POINT OF CROSSING AND EACH OTHER. WHERE A POTABLE WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER LINE TO PREVENT DAMAGE TO THE POTABLE WATER MAIN WHILE MAINTAINING LINE AND GRADE.
 - d. FORCE MAINS. THERE SHALL BE AT LEAST A 10 FOOT HORIZONTAL SEPARATION BETWEEN SANITARY SEWER FORCE MAINS AND POTABLE WATER MAINS. THERE SHALL BE AN 18 INCH VERTICAL SEPARATION AT CROSSING AS REQUIRED IN SUBSECTION 67.300.A.14.B AND SUBSECTION 67.300.A.14.C.
 - e. SPECIAL CONDITIONS. WHEN IT IS IMPOSSIBLE TO OBTAIN THE DISTANCES SPECIFIED IN SUBSECTION 67.300.A.14.B, SUBSECTION 67.300.A.14.C, AND SUBSECTION 67.300.A.14.D THE DEPARTMENT MAY ALLOW AN ALTERNATIVE DESIGN. ANY ALTERNATIVE DESIGN SHALL:
 - i. MAXIMIZE THE DISTANCES BETWEEN THE SEWER LINE AND THE POTABLE WATER MAIN AND THE JOINTS OF EACH;
 - ii. USE PIPE MATERIALS WHICH MEET THE REQUIREMENTS AS SPECIFIED IN REGULATION 61-58.4(D)(1) FOR THE SEWER LINE; AND
 - iii. ALLOW ENOUGH DISTANCE TO MAKE REPAIRS TO ONE OF THE LINES WITHOUT DAMAGING THE OTHER.
 - f. SEWER MANHOLES. NO POTABLE WATER PIPE SHALL PASS THROUGH OR COME INTO CONTACT WITH ANY PART OF A SEWER MANHOLE.
- 3. MANHOLE TOP ELEVATIONS SHALL BE GREATER THAN OR EQUAL TO THE FIFTY (50) YEAR FLOOD ELEVATION, UNLESS WATERTIGHT COVERS ARE PROVIDED. (67.300.B.7)
- 4. DROP MANHOLES ARE REQUIRED WHERE THE INVERT DIFFERENTIAL IS 24 INCHES OR MORE. (67.300.B.8)
- 5. EACH SECTION OF SEWER PIPE SHALL BE SPECIFIED TO BE LAID TO THE APPROPRIATE LINE AND GRADE, AS DESIGNED, WORKING IN THE UPSTREAM DIRECTION WITH THE BELL END LAID UPGRADE. (67.300.B.11)
- 6. ALL GRAVITY SEWERS SHALL BE DESIGNED AND SPECIFIED SUCH THAT THE LEAKAGE OUTWARD (EXFILTRATION) OR INWARD (INFILTRATION) SHALL NOT EXCEED TWO HUNDRED (200) GALLONS PER INCH OF PIPE DIAMETER PER MILE PER DAY. AN AIR TEST MAY BE UTILIZED IN LIEU OF AN INFILTRATION/EXFILTRATION TEST, IF APPROVED BY THE DEPARTMENT. AIR TESTING SHALL CONFORM TO ASTM F-1417 (PLASTIC PIPE). (67.300.B.12)
- 7. FOR FORCE MAINS, THRUST BLOCKING OR RESTRAINT JOINTS SHALL BE PROVIDED AT ALL CHANGES IN ALIGNMENT GREATER THAN OR EQUAL TO 30 DEGREES. (67.300.D.3)
- 8. AN AUTOMATIC AIR RELIEF VALVES SHALL BE PLACED AT HIGH POINTS IN THE FORCE MAIN SEWER TO PREVENT AIR LOCKING. (67.300.D.4)
- 9. DESIGN AND CONSTRUCTION OF FORCE MAINS SHALL BE SUCH THAT THEY SATISFY A LEAKAGE TEST IN ACCORDANCE WITH AWWA C-600 (DIP) OR AWWA C-605 (PVC). (67.300.D.6)

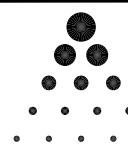
D. CONSTRUCTION DETAILS:

- 1. TYPICAL MANHOLE, DROP MANHOLE DETAILS AND FORCE MAIN TIE-IN DETAILS, SHOWING HORIZONTAL AND VERTICAL CROSS SECTIONS SHALL INCLUDE THE FOLLOWING:
 - a. MANHOLES SHALL HAVE A MINIMUM INSIDE DIAMETER OF 4 FEET AND 5 FEET WITH AN INSIDE DROP PIPE. THE MINIMUM MANHOLE ACCESS DIAMETER SHALL BE 22 INCHES. (67.300.B.9)
 - b. FORCE MAINS TYING ONTO MANHOLES SHALL ENTER THE MANHOLE A VERTICAL DISTANCE OF NOT MORE THAN 2 FEET ABOVE THE FLOW LINE OF THE RECEIVING MANHOLE. (67.300.D.5)

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

SEWER NOTES

 <p>PALMETTO STATE UTILITY SERVICES, INC. A Subsidiary of American States Utility Services, Inc. Building 2576, Essayons Way Fort Jackson, SC 29207 Tel: (803) 790-7288 Fax: (803) 787-2054</p>	REVISIONS						SCALE: NTS S1
	ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
		1	NEW SHEET	SFM	3-16-09		

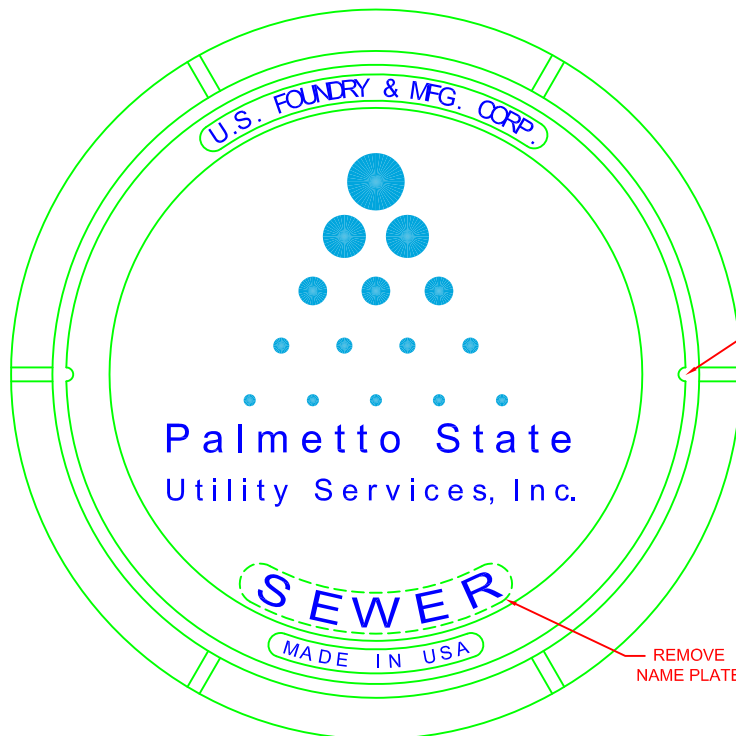
Thursday, May 27, 2010

GENERAL NOTES:

1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
3. PRODUCT SHALL BE U.S. FOUNDRY & MFG. CORP. ORDERED AS FOLLOWS:

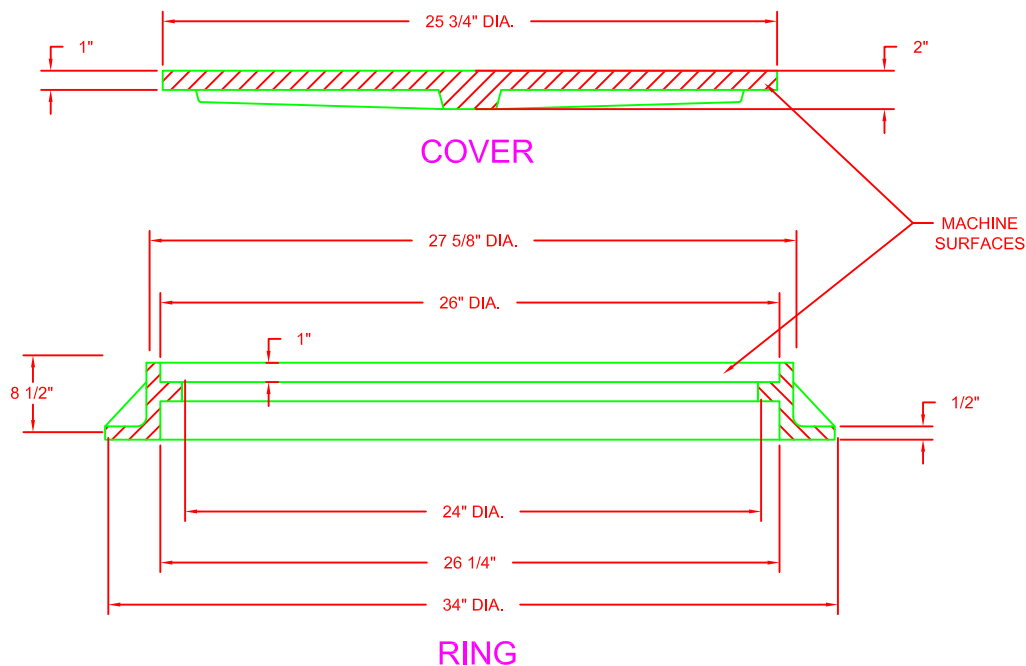
MATERIAL: ASTM - A48
GRAY IRON CLASS: 35B
RING WEIGHT: 260 LBS.
COVER WEIGHT: 140 LBS
ITEM NO.: 8014845

1



- (2) PENETRATING PICKHOLES

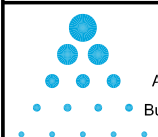
— REMOVE
NAME PLATE



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

24" MANHOLE RING AND COVER

PALMETTO STATE UTILITY
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ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	ADD RING AND COVER INFORMATION	SFM	3-16-09	
					Thurs

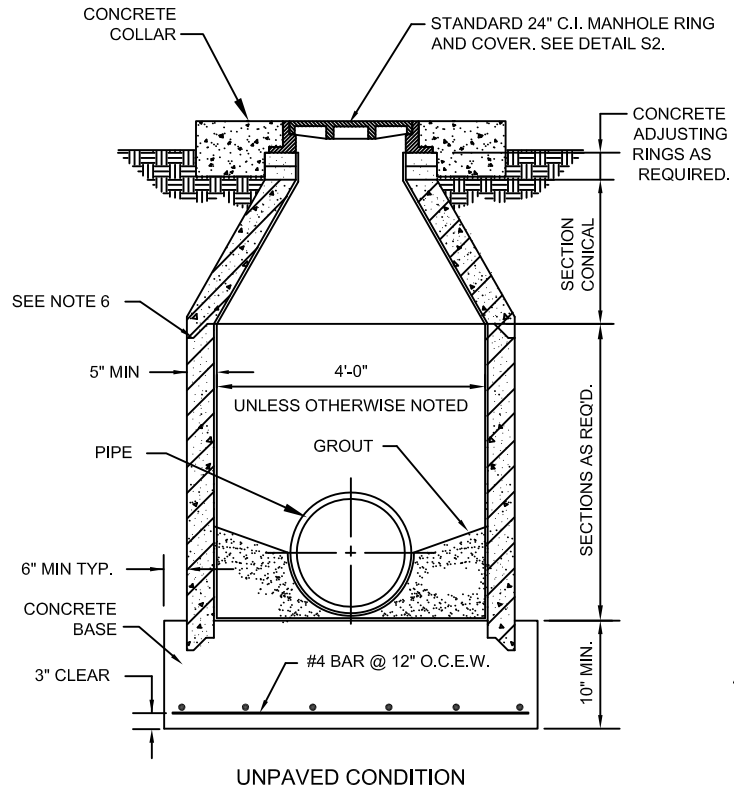
SCALE:

NTS

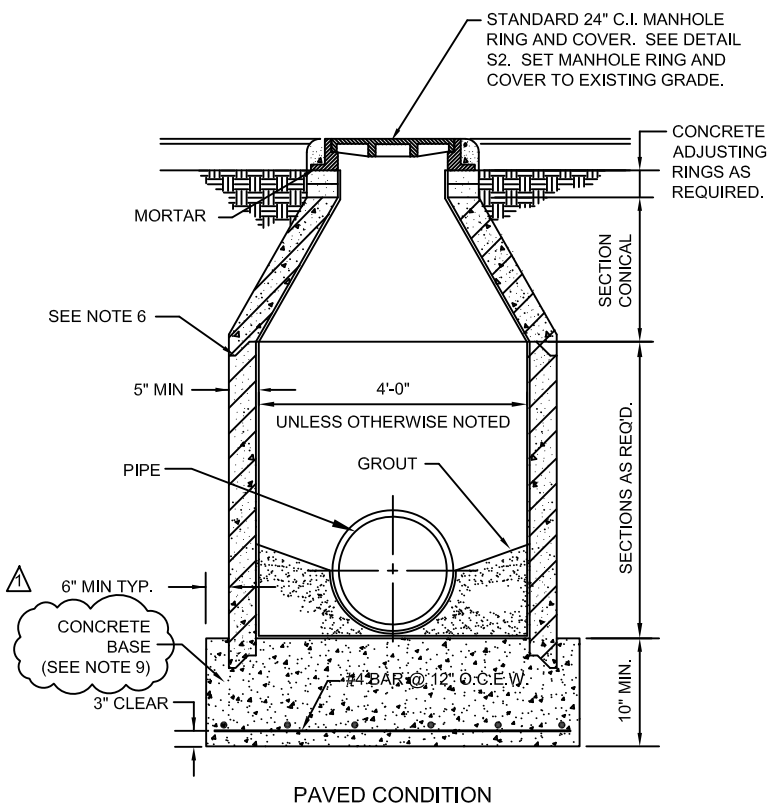
DRAWING NUMBER

52

Thursday, May 27, 2010




- GENERAL NOTES:**
1. THE PRE-CAST MANHOLE RISER AND CONICAL SECTIONS SHALL BE REINFORCED CONCRETE AND SHALL CONFORM TO ASTM SPECIFICATION C-478.
 2. THE CONICAL SECTIONS CAN BE CONCENTRIC AND SHALL BE ADAPTED TO THE RING AT ONE END AND PSUS STANDARD CAST IRON FRAME AT THE OTHER.
 3. THE PRE-CAST CONCRETE SHALL HAVE A MINIMUM ALLOWABLE COMPRESSIVE STRENGTH AT 28 DAYS OF 4000 POUNDS/SQ. INCH FOR THE RISER SECTIONS AND FOR THE CONICAL SECTIONS.
 4. THE RISER SECTIONS SHALL BE REINFORCED WITH STEEL WIRE MESH 6x6x10x10 AND THE CONICAL SECTION SHALL HAVE 6x6x10x10 STEEL WIRE MESH REINFORCEMENT AND 3/8 ROD AT TOP AND BOTTOM. (SEE ASTM STANDARDS PART 16-C-478).
 5. THE BASE SHALL BE CLASS B CONCRETE POURED ON UNDISTURBED OR SUB-BASE, COMPACTED TO 95% ASTM D1557.
 6. ALL JOINTS, SHALL BE TONGUE AND GROOVE WITH PREFORMED FLEXIBLE BUTYL RUBBER MASTIC SEALANT. SEALANT SHALL CONFORM TO AASHTO M-198 AND FEDERAL SPECIFICATION SS-S-210A.
 7. FOR PIPE CONNECTION SEE DETAIL S4.
 8. THE INTERIOR OF THE MANHOLE SHALL BE LINED WITH A TWO STEP POLYURETHANE PROTECTIVE COATING.
STEP ONE WILL BE ONE OF THE FOLLOWING PRIMER:
 - TNE MEC SERIES 201 EPOXPRIME.
 - RAVEN 110 PRIMER.STEP TWO WILL BE ONE OF THE FOLLOWING TOPCOAT LINER:
 - TNE MEC SERIES 436 PERMA-SHIELD FR.
 - RAVEN 404.
 9. ENGINEERED PRE-CAST BASE SHALL BE ALLOWED



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: 48" MANHOLE

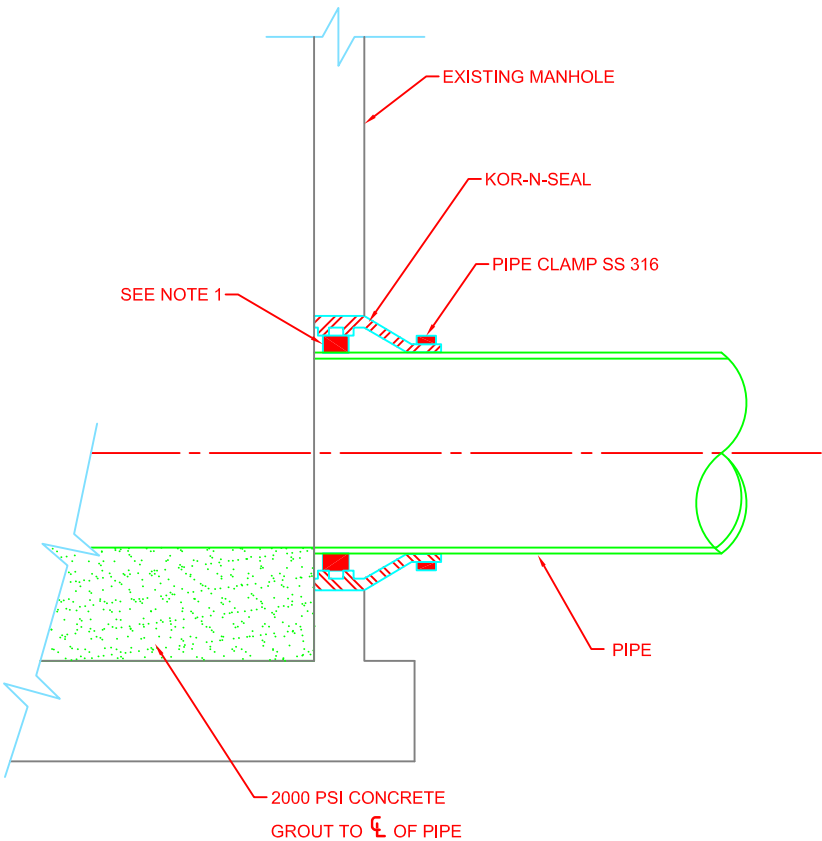


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ZONE		REV.	DESCRIPTION	BY	DATE	APP.
			ORIGINAL ISSUE DATE		6-11-08	
1			ALLOWANCE FOR PRECAST CONCRETE	SFM	3-16-09	

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DRAWING NUMBER
S3

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STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: MANHOLE PRENTRATION



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		REVISIONS				
ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
		ORIGINAL ISSUE DATE		6-11-08		
	1	NO CHANGES	SFM	3-16-09		

SCALE:

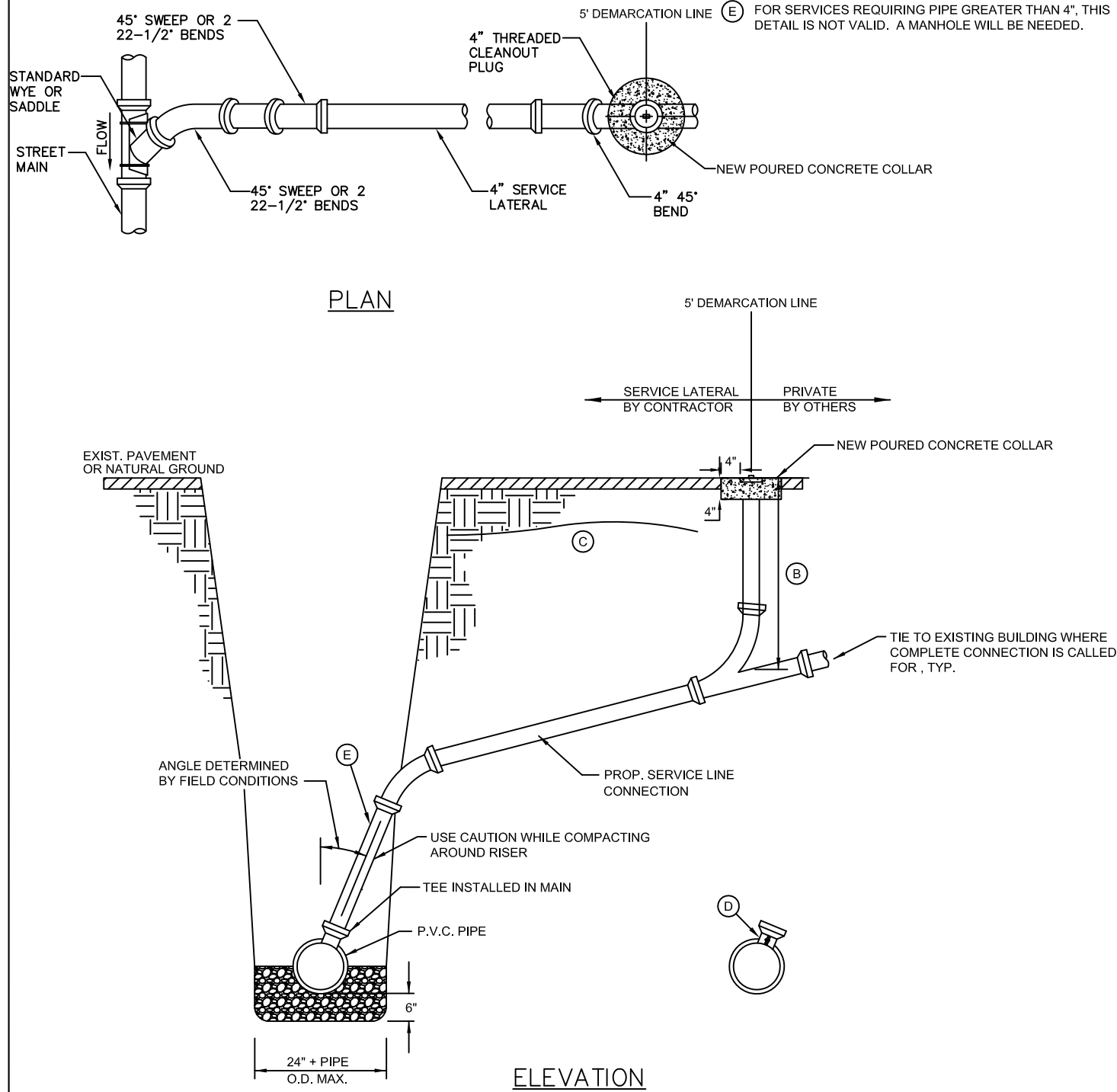
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Thursday, May 27, 2010

S4

CONSTRUCTION KEY NOTES:

- (A) CONTRACTOR TO INSTALL SEWER SERVICE LINE FROM THE MAIN TO A LOCATION 6" BEHIND THE CURB OR 18" BEYOND THE EDGE OF PAVEMENT,
- (B) 3.5' MINIMUM.
- (C) PLASTIC METALLIC MARKING TAPE RISING TO WITHIN 6" OF GROUND SURFACE OR METALLIC DISK.
- (D) IF A NEW SERVICE IS REQUIRED ON AN EXISTING SEWER, A TAPPING SLEEVE OR MANHOLE WILL BE USED.
- (E) FOR SERVICES REQUIRING PIPE GREATER THAN 4", THIS DETAIL IS NOT VALID. A MANHOLE WILL BE NEEDED.



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

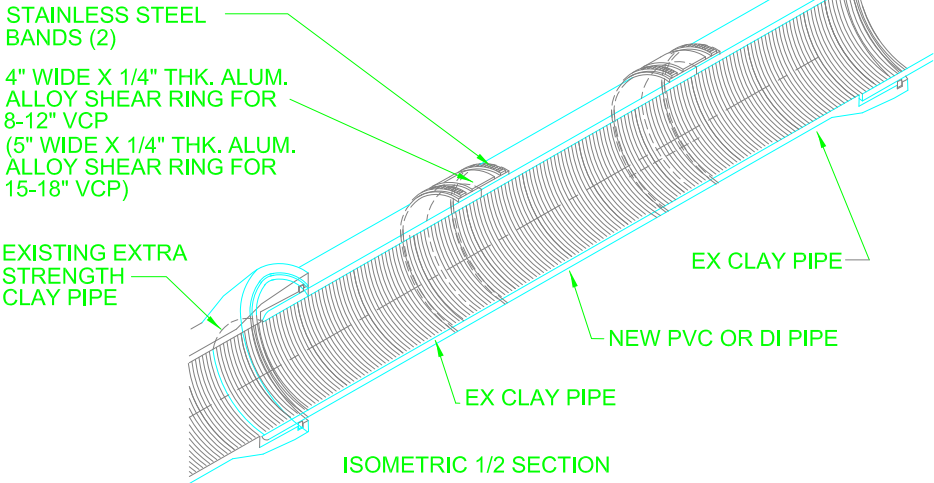
TITLE: SEWER SERVICE LATERAL

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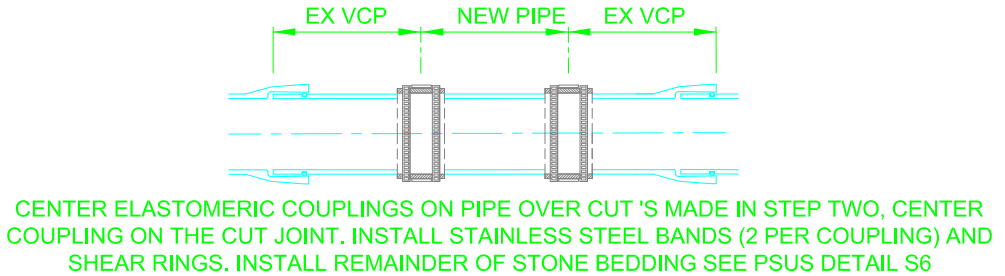
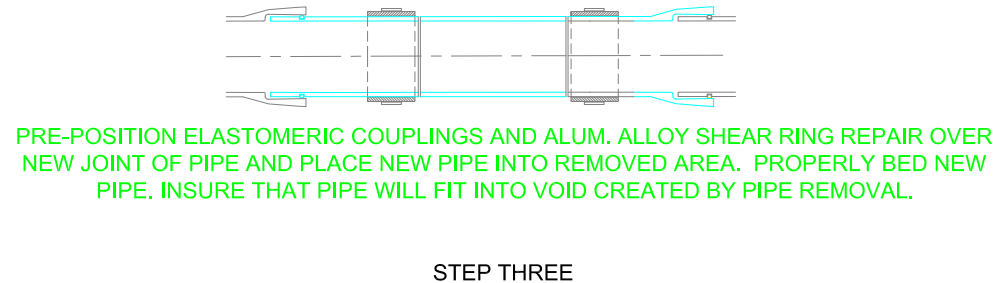
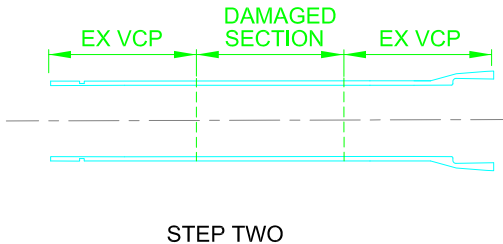
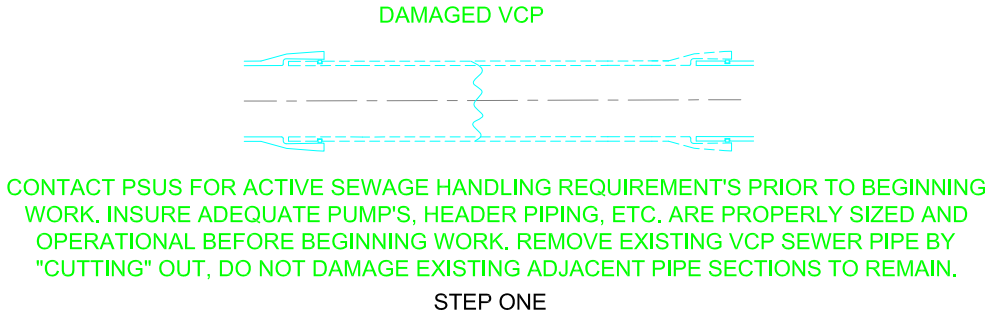
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ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
			SFM	3-16-09	

SCALE:
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DRAWING NUMBER
S5

Thursday, May 27, 2010



- NOTES:
1. SANITARY SEWER REPAIR OF VCP MUST BE APPROVED BY PSUS PRIOR TO MAKING THE REPAIR, OTHERWISE, THE CONTRACTOR SHALL BE REQUIRED TO REMOVE AND RELAY ANY DAMAGED SECTIONS OF PIPE TO NEAREST MANHOLE.
 2. ALL MATERIALS OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF PSUS.
 3. CONTRACTOR SHALL PROVIDE ALL NECESSARY PUMPS, HEADER PIPE, PUMPING EQUIPMENT ETC. PRIOR TO BEGINNING CONSTRUCTION. DUPLICATE SEWAGE HANDLING PUMPS, PIPING ETC. SHALL BE ON-SITE AND AVAILABLE FOR IMMEDIATE USE SHOULD PRIMARY PUMP OR FORCE MAIN FAIL.
 4. WHERE PIPE FAILURE OF EXISTING SYSTEM OCCURS AT THE BELL AND TWO PIECES OF PIPE ARE DAMAGED, BOTH PIECES OF PIPE SHALL BE COMPLETELY REMOVED.
 5. PIPE REPAIR SHALL EXHIBIT STRAIGHT HORIZONTAL ALIGNMENT AND INVERT SHALL BE THE SAME AS THE EXISTING PIPE SLOPE. DEFLECTIONS OF HORIZONTAL AND VERTICAL ALIGNMENT ARE NOT ACCEPTABLE.
 6. PIPE SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND PSUS DRAWING S6 SEWER BEDDING



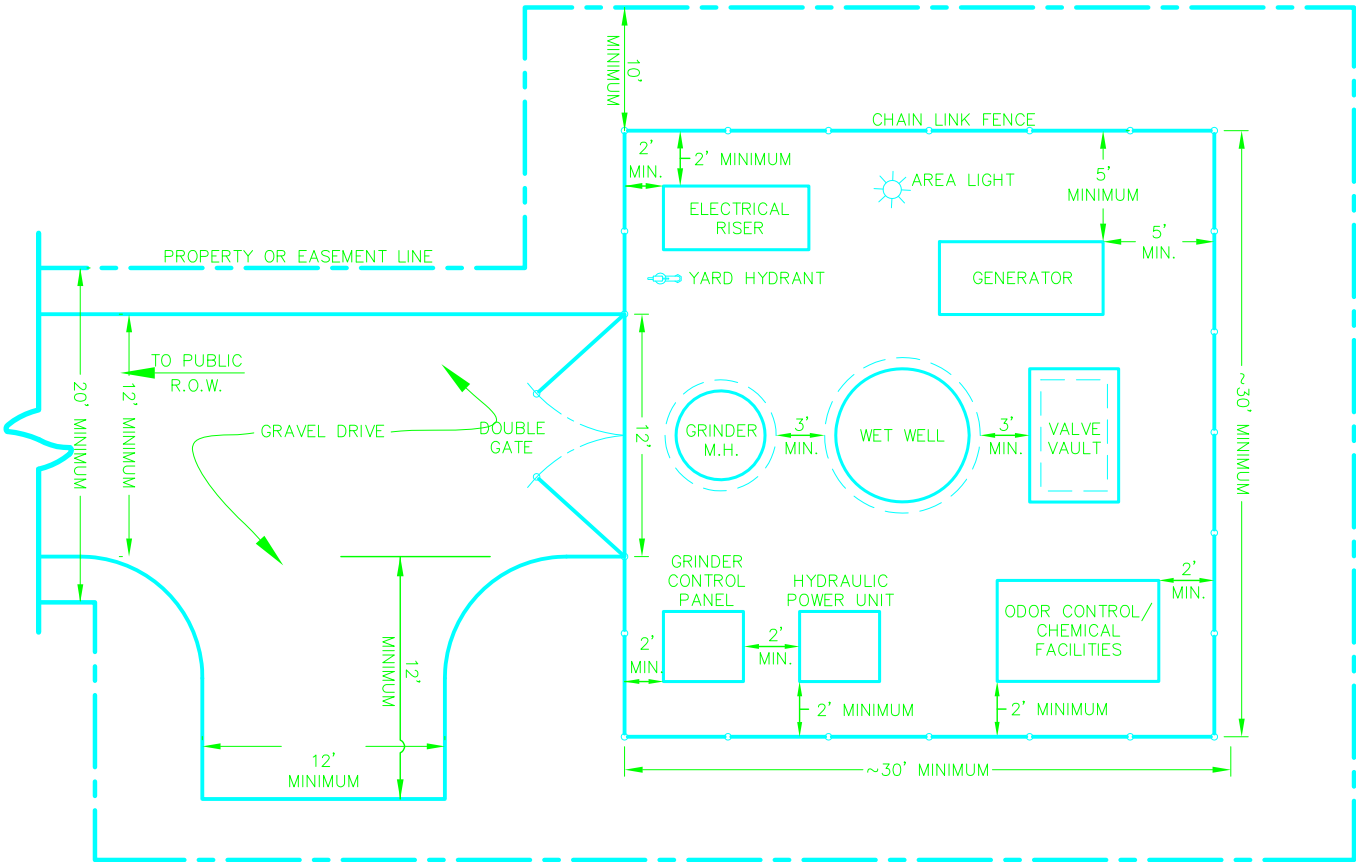
STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: VCP SANITARY SEWER REPAIR


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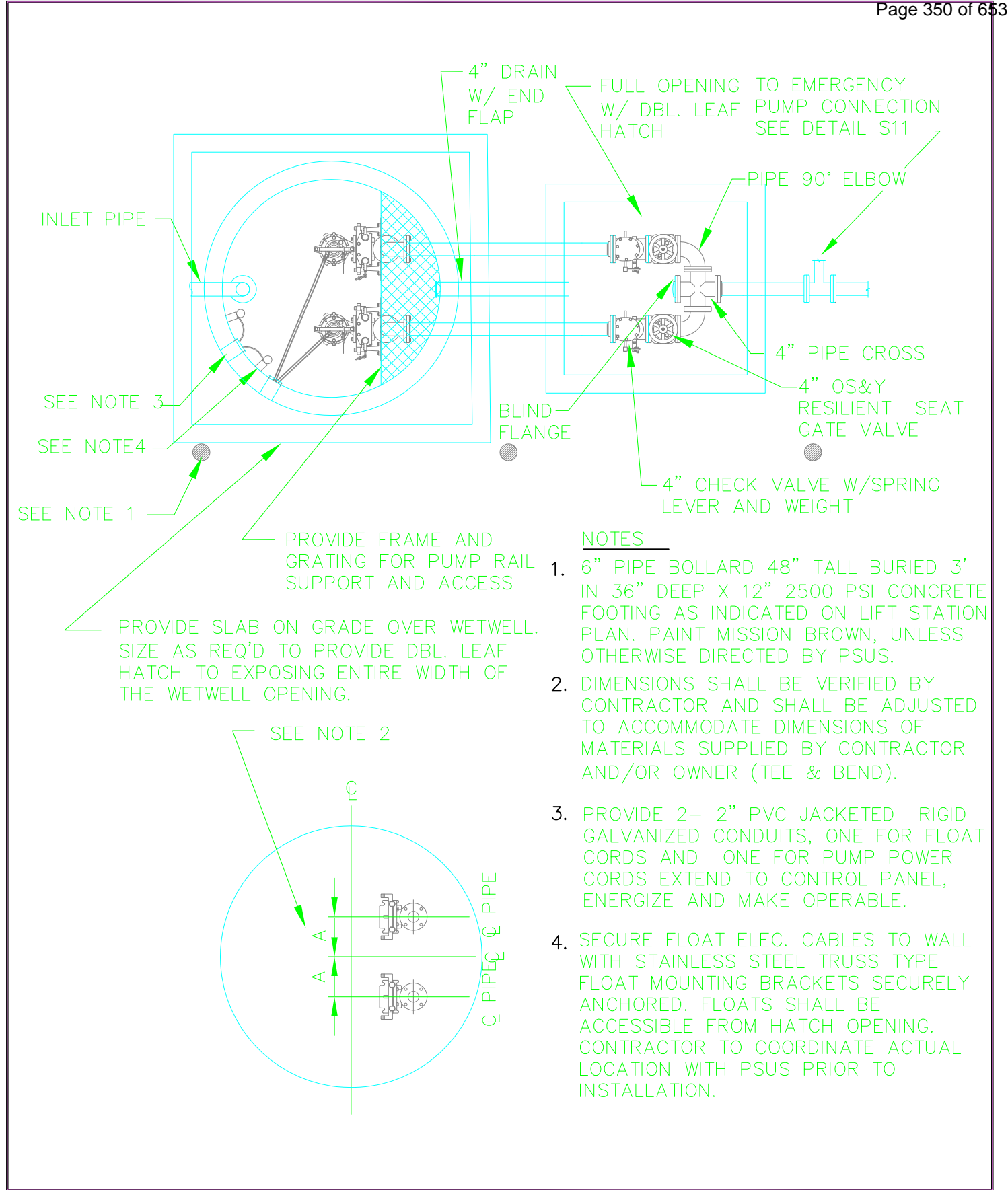
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ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		NEW SHEET	SFM	3-16-09	


SCALE:
NTS
Thursday, May 27, 2010
S7



- NOTES:
- 1. PUMP STATION PROPERTY OR EASEMENT SHALL BE 50' x 50' (ft.) MINIMUM.
 - 2. EQUIPMENT LOCATIONS AND DIMENSIONS MAY VARY.
 - 3. SITE WITHIN FENCE SHALL BE 5" (inches) THICK REINFORCED CONCRETE SLAB OR 3" (inches) CRUSHED STONE OVER GEOTEXTILE FABRIC (SPECIFIED BY PSUS ENGINEER).
 - 4. THE PUMP STATION SITE LAYOUT AND DESIGN SHALL MEET ALL FORT BRAGG SITE PLANNING AND DESIGN REQUIREMENTS.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON					TITLE: LIFT STATION SITE LAYOUT				
 <div>PALMETTO STATE UTILITY SERVICES, INC. A Subsidiary of American States Utility Services, Inc. Building 2576, Essayons Way Fort Jackson, SC 29207 Tel: (803) 790-7288 Fax: (803) 787-2054</div>	REVISIONS						SCALE: NTS		
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		1	NEW SHEET			SFM	3-16-09		

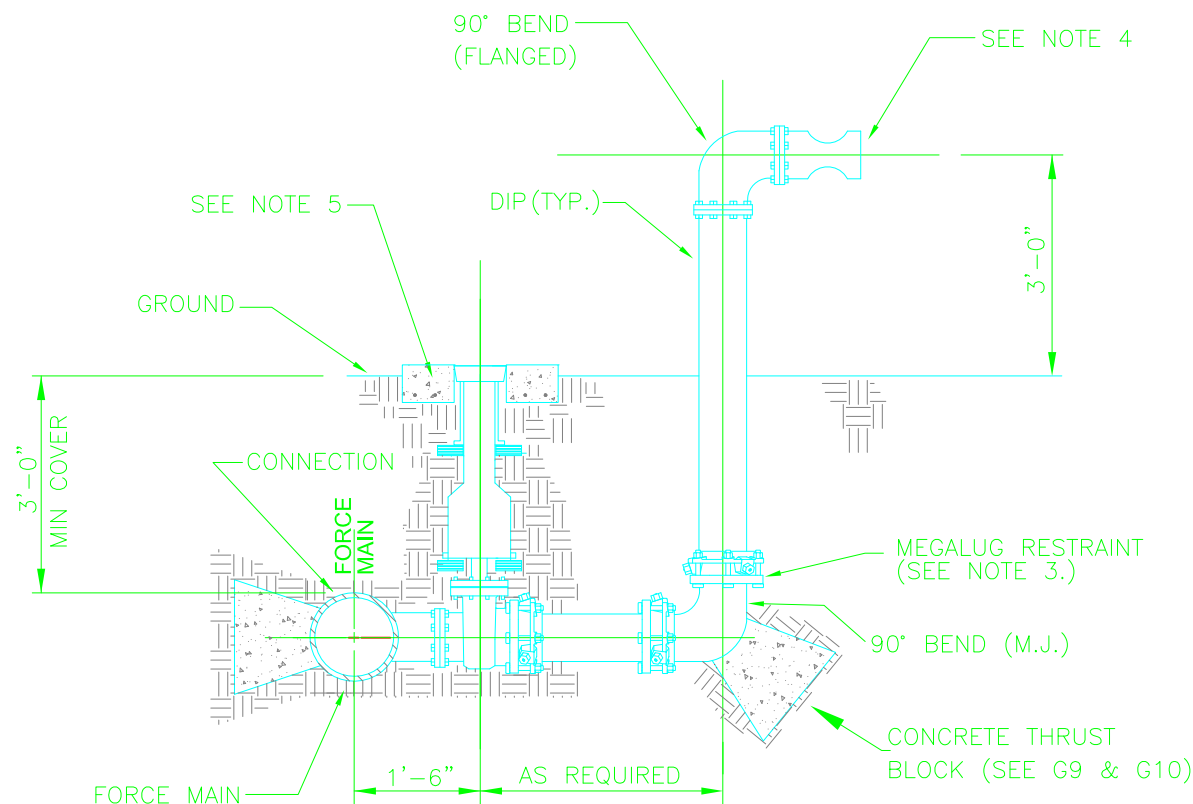


STANDARD CONSTRUCTION DRAWING - FORT JACKSON					TITLE: LIFT STATION PLAN				
 <div><div>PALMETTO STATE UTILITY SERVICES, INC.</div><div>A Subsidiary of American States Utility Services, Inc.</div><div>Building 2576, Essayons Way Fort Jackson, SC 29207</div><div>Tel: (803) 790-7288 Fax: (803) 787-2054</div></div>	REVISIONS					SCALE:			
	ZONE	REV.	DESCRIPTION	BY	DATE	APP.	NTS		
		1	NEW SHEET	SFM	3-16-09		DRAWING NUMBER		
							S9		
							Thursday, May 27, 2010		

STATIC HEAD _____
PUMPING RATE ____ GPM @ _____' TDH
ONE PUMP OPERATING WITH
LAG PUMP LOCK OUT. IF
LEAD PUMP DOES NOT COME
ON, LAG WILL COME ON. ONE
PUMP WILL RUN INDEPENDENTLY
ON EACH CYCLE ALTERNATELY.

S10


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- NOTES:
- 1. ALL MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH PSUS STANDARDS.
 - 2. ALL DUCTILE IRON PIPE SHALL HAVE AN INTERIOR LINING OF CERAMIC EPOXY OR FUSED CALCIUM ALUMINATE AGGREGATES.
 - 3. ALL BELOW GRADE FITTINGS SHALL BE MECHANICAL JOINT.
 - 4. ALUM CAMLOK COUPLING W/ CAP AND CHAIN BY PT COUPLING CO. OR APPROVED EQUAL. COORDINATE WITH OWNER TO MATCH HOSE TYPE AND DIRECTION TO FACE.
 - 5. 3000 PSI CONCRETE 6" THICK BY 3" TO 4" IN DIAMETER. TAPER EDGE AND RAISE 2" ABOVE ADJACENT GROUND SURFACE.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: EMERGENCY CONNECTION



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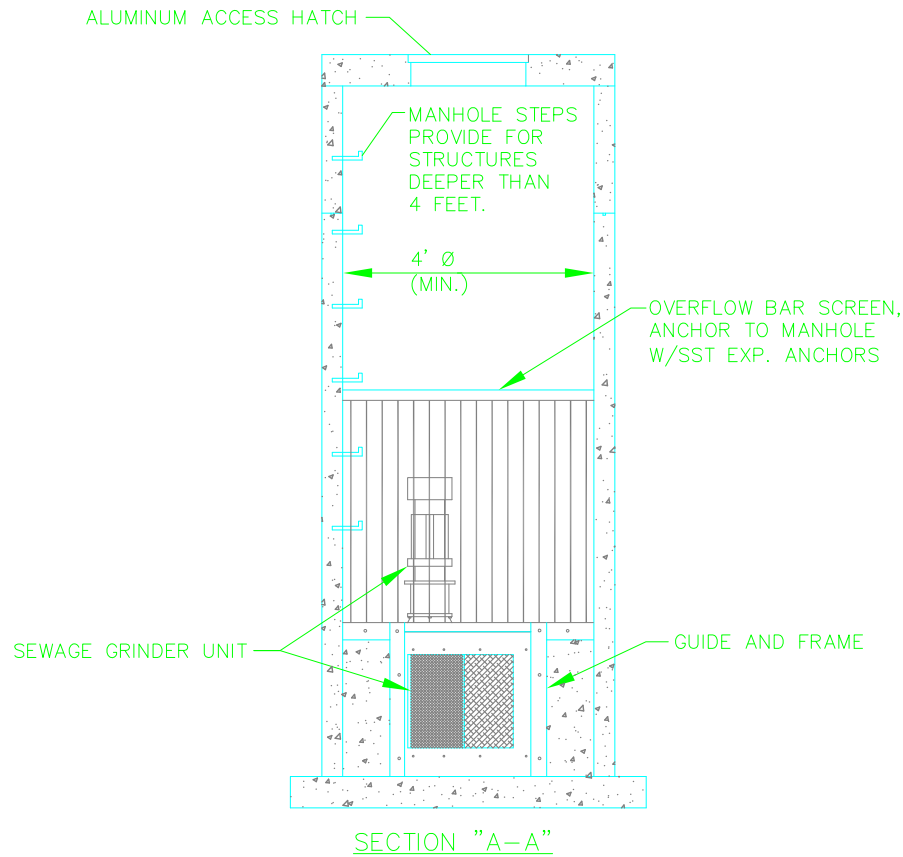
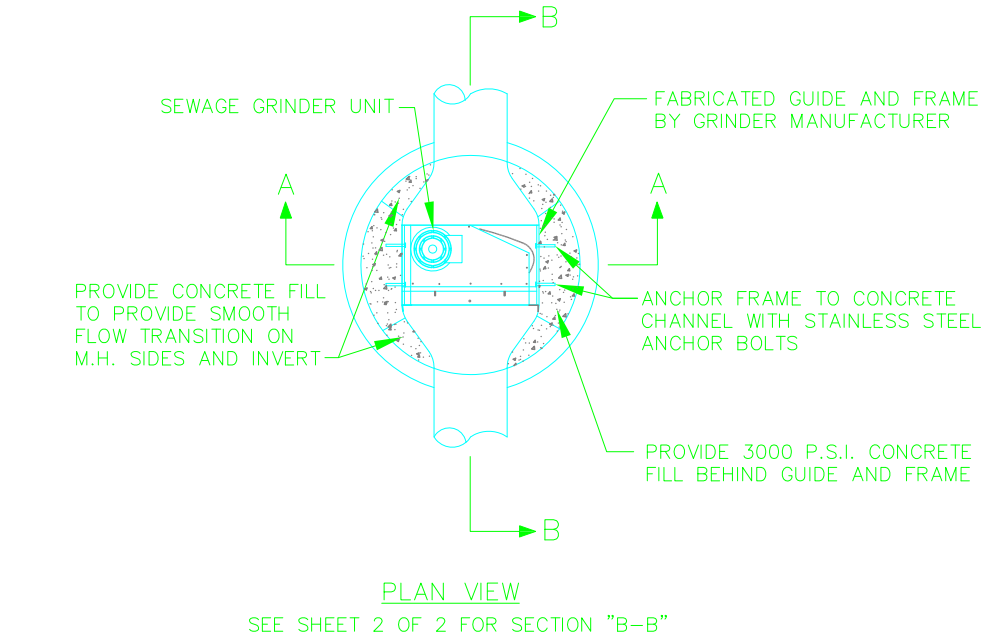
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	1	NEW SHEET	SFM	3-16-09	

SCALE:

NTS

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S11



- NOTES:
- 1. THERE SHALL ONLY BE A SINGLE INFLUENT LINE INTO THE GRINDER MANHOLE.
 - 2. GRINDER MANHOLES SHALL BE EPOXY COATED.
 - 3. GRINDERS SHALL BE PROVIDED ON ALL NEW SANITARY SEWER LIFT STATIONS INSTALLED DOWNSTREAM OF CAPITAL PROJECTS AT FORT JACKSON THAT INCLUDE TROOP LIVING QUARTERS. JWC ENVIRONMENTAL MUFFIN MONSTER GRINDERS, OR EQUAL, ARE APPROVED BY PSUS FOR USE AT FORT JACKSON.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: SEWER GRINDER UNIT - SECTION "A-A"



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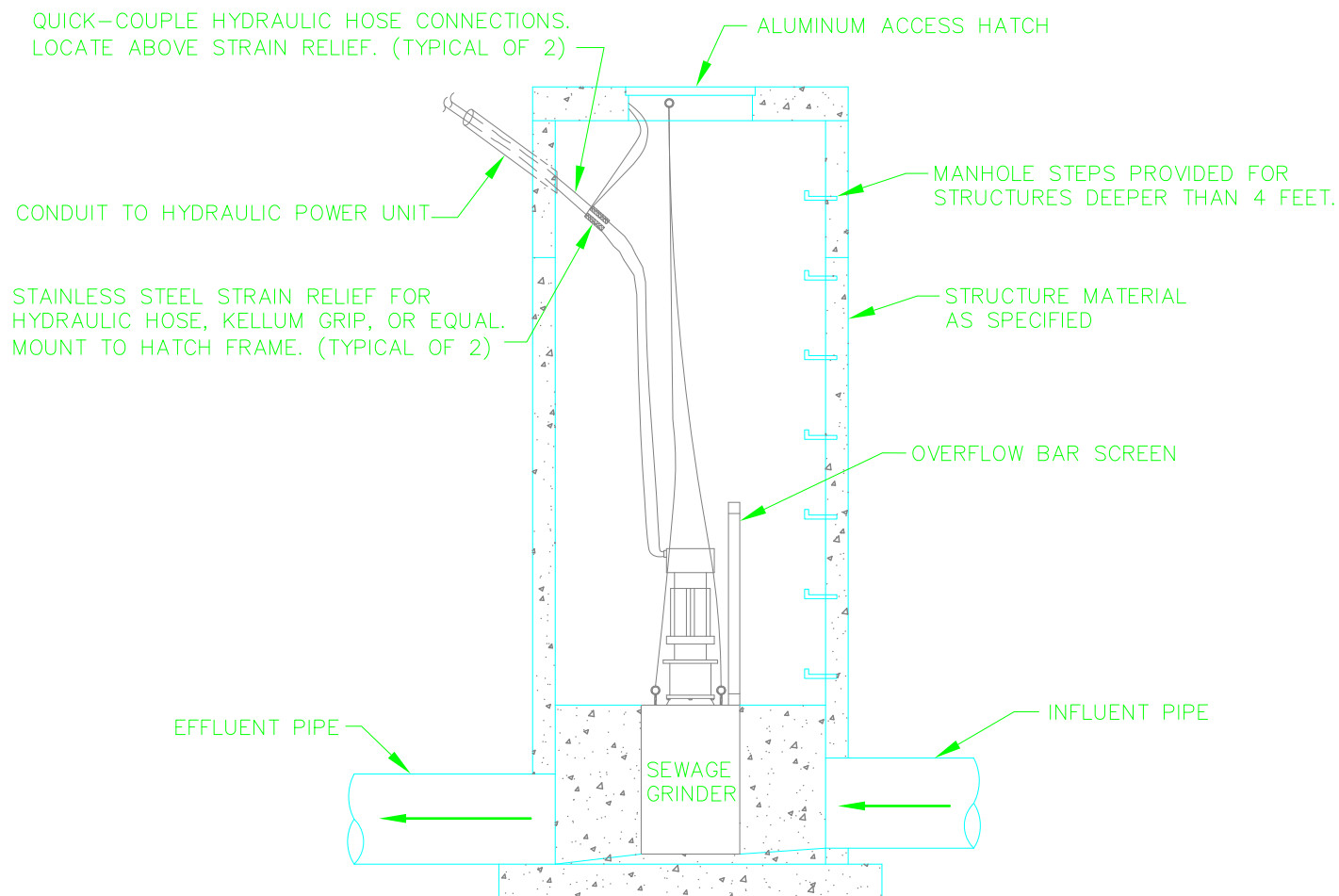
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		NEW SHEET	SFM	3-16-09		

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DRAWING NUMBER S12


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SECTION "B-B"
SEE SHEET S12 FOR PLAN VIEW AND SECTION "A-A"

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: SEWER GRINDER UNIT - SECTION "B-B"

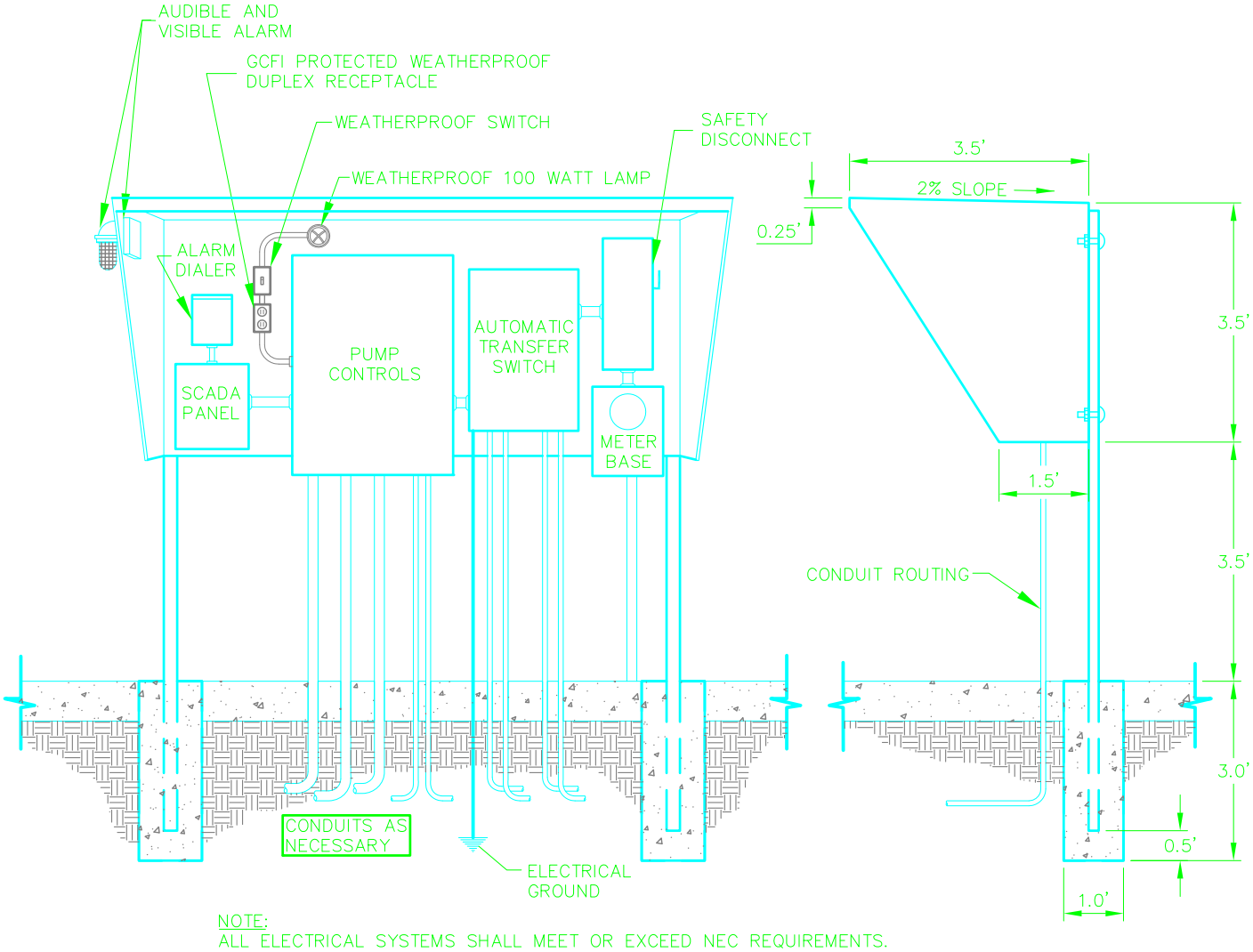


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LIFT STATION NOTES

1. CONCRETE SHALL BE 4,000 PSI COMPRESSION STRENGTH.
2. MANHOLE SHALL MEET REQUIREMENTS OF ASTM C-478.
3. ALL ELECTRICAL MATERIAL & INSTALLATION SHALL BE BY A LICENSED ELECTRICIAN AND IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, AND RULES AND REGULATIONS OF FORT JACKSON. MATERIALS SHALL BE LISTED OR LABELED BY THE UNDERWRITERS LABORATORIES STANDARDS.
4. LIFT STATION MANHOLE CONCRETE SLAB AND HATCH SHALL BE MANUFACTURED TO WITHSTAND H-20 LOADING CONDITIONS.
5. MANUFACTURER SHALL BE REQUIRED TO SUBMIT DESIGN CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER WITH SHOP DRAWINGS AND REVIEW SUBMITTAL.
6. SHOP DRAWINGS AND WIRING DIAGRAMS SHALL BE PROVIDED FOR ALL ELECTRICAL EQUIPMENT.
7. ENGINEER TO DESIGN FOUNDATION BED AND APPROVE FOUNDATION BED BEFORE SETTING LIFT STATION STRUCTURES.
8. CONTRACTOR IS TO PROVIDE DEWATERING EQUIPMENT AS REQUIRED FOR CONSTRUCTION AT NO ADDITIONAL COST TO PSUS.
9. HATCH DOORS AND CONTROL PANEL BOX SHALL BE LOCKABLE AND KEYED TO PSUS MASTER LOCK SYSTEM. CONTRACTOR SHALL FURNISH 3 LOCKS AND KEYS.
10. CONTRACTOR SHALL INSTALL ALL PSUS FURNISHED EQUIPMENT AS REQUIRED AND PROVIDE START UP AND TRAINING SERVICES (MIN. 2 DAYS).
11. CONTRACTOR SHALL FURNISH AND INSTALL ALL EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO MAKE THE LIFT STATION FULLY OPERATIONAL AND IN ACCORDANCE WITH PSUS STANDARDS.
12. RECESSED LIFTING HOOKS SHALL BE PLACED IN CONCRETE WET WELL COVER. CONTROL PANEL BOX SHALL BE ANCHORED IN 12" X 24" DEEP CONCRETE FOOTING (SEE DETAIL.).
13. CONTRACTOR SHALL PROVIDE ALL NECESSARY LUBRICANTS FOR STARTUP AND SHALL ASSIST THE EQUIPMENT MANUFACTURER AND PSUS WITH INITIAL STARTUP (MIN. 2 DAYS).
14. PIPEWORK SHALL BE ASSEMBLED, INSTALLED, AND FULLY SUPPORTED SO AS NOT TO PUT A STRAIN ON THE PUMPING EQUIPMENT, PIPE FITTINGS AND ELBOWS.
15. ALL THRU-THE-WALL SLEEVES AND CARRIER PIPES INTO THE WET WELL SHALL BE INSTALLED ABSOLUTELY WATERTIGHT WITH NO SIGNS OF SEEPAGE OR INFILTRATION.
16. ENTIRE SITE SHALL BE FENCED FOR SECURITY. CONTRACTOR SHALL PROVIDE LOCKS FOR GATE OPENING.
17. ALL HANGERS, CLAMPS, FLANGE BOLTS, AND CONNECTIONS SHALL BE STAINLESS STEEL UNLESS OTHERWISE SPECIFIED. THESE ITEMS TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
18. ALL DIMENSIONS SHALL BE VERIFIED BY CONTRACTOR AND SHALL BE ADJUSTED TO ACCOMMODATE DIMENSIONS OF MATERIALS SUPPLIED BY CONTRACTOR AND ONUS.
19. FLANGE FACES SHALL BE SERRATED.


HATCH DOOR NOTES

1. HATCH SHALL BE, RATED H-20 LOADING AND INCLUDE CHANNEL FRAMING AND ALUMINUM DIAMOND PATTERN PLATE DOOR.
2. HATCH DOORS SHALL BE WATERTIGHT EQUIPPED W/NEOPRENE GASKET, HINGED WITH LOCKING MECHANISM, AND AUTOMATIC HOLD OPEN ARM.
3. SET DOOR UNIT WITH SLIGHT PITCH TOWARD DRAIN.
4. DO NOT RACK OR TWIST FRAME WHEN SETTING UNIT. BLOCK UP AND SHIM THE FRAME IF NECESSARY TO BE SURE COVERS REST EVENLY ON FRAME ALL AROUND.
5. DO NOT REDUCE 1-1/2"(38mm) PIPE TO DRY WELL OR DISPOSAL SYSTEM.
6. SUPPORT SHELF MUST BE SUPPORTED BY CONCRETE OR STEEL TO CARRY H-20 LOADING.
7. ALL HARDWARE SHALL BE ZINC PLATED STEEL-CHROMATE SEALED OR STAINLESS.

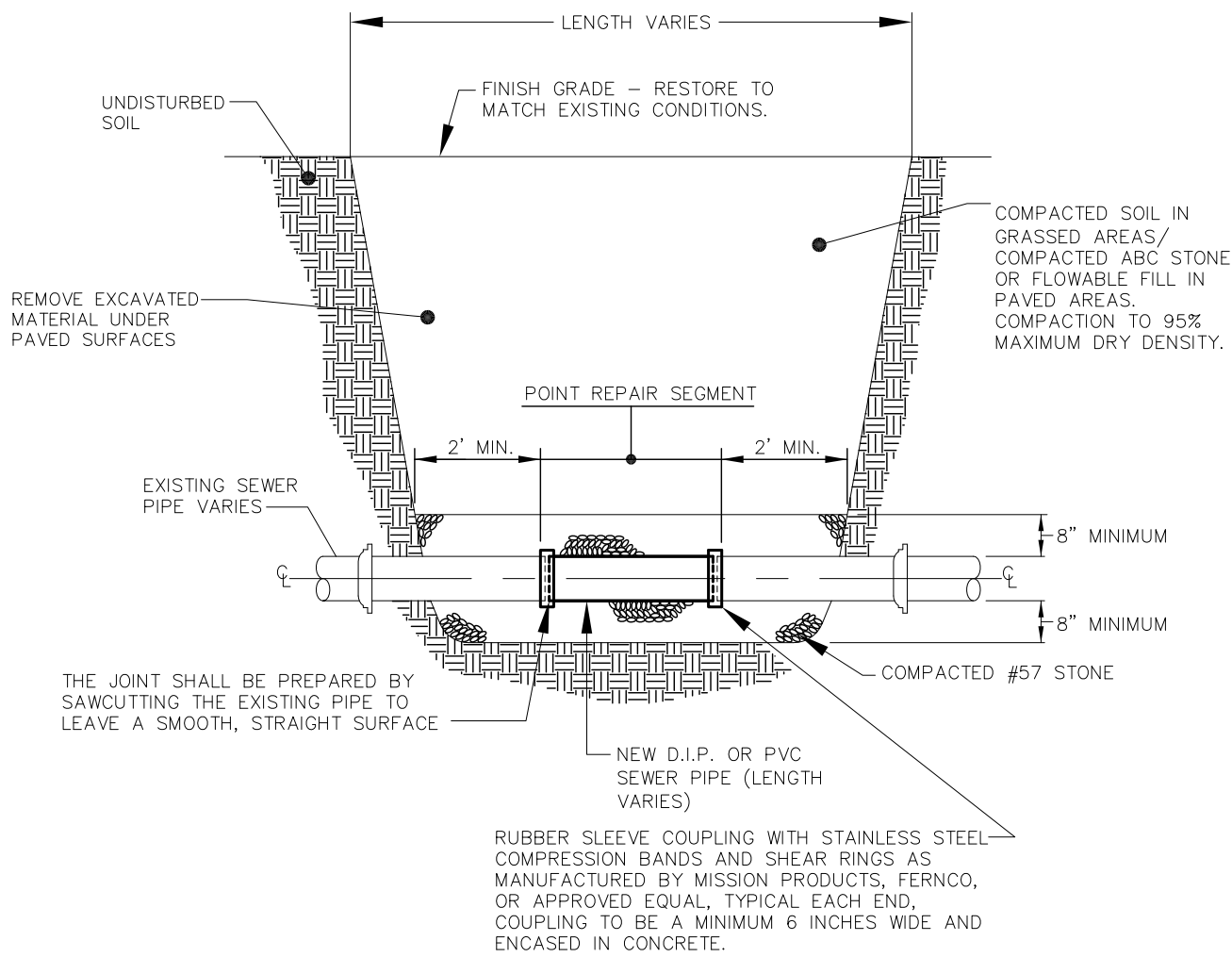
STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

LIFT STATION NOTES

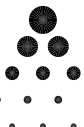
 PALMETTO STATE UTILITY SERVICES, INC. A Subsidiary of American States Utility Services, Inc. Building 2576, Essayons Way Fort Jackson, SC 29207 Tel: (803) 790-7288 Fax: (803) 787-2054	REVISIONS						SCALE: NTS
	ZONE	REV.	DESCRIPTION	BY	DATE	APP.	DRAWING NUMBER S15
			NEW SHEET	SFM	3-16-09		

Thursday, May 27, 2010



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: SEWER POINT REPAIR



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Tel: (803) 790-7288 Fax: (803) 787-2054

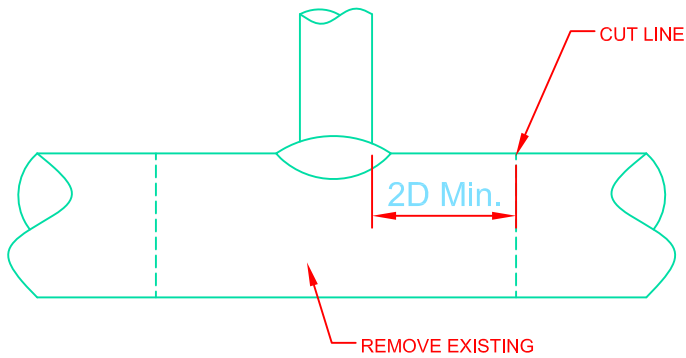
ZONE		REV.	DESCRIPTION	BY	DATE	APP.
			NEW DETAIL	SFM	3-16-09	

SCALE:
NTS
DRAWING NUMBER
S16

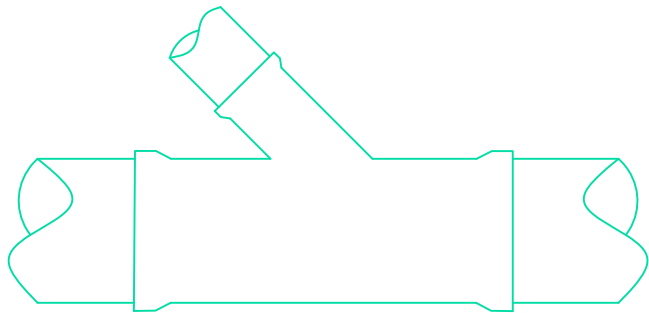
Thursday, May 27, 2010

GENERAL NOTES:

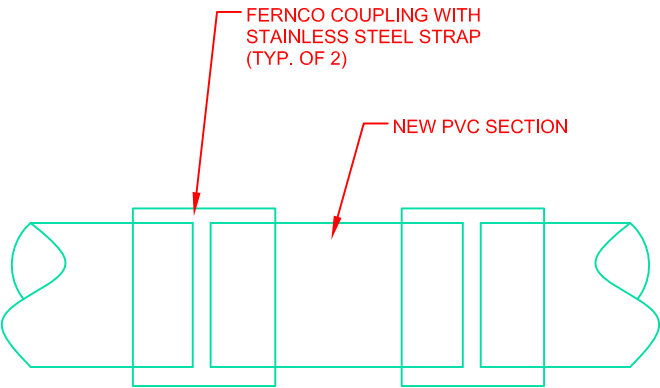
1. INSERT NEW PVC PIPE SECTION PER STANDARD DETAIL S16.



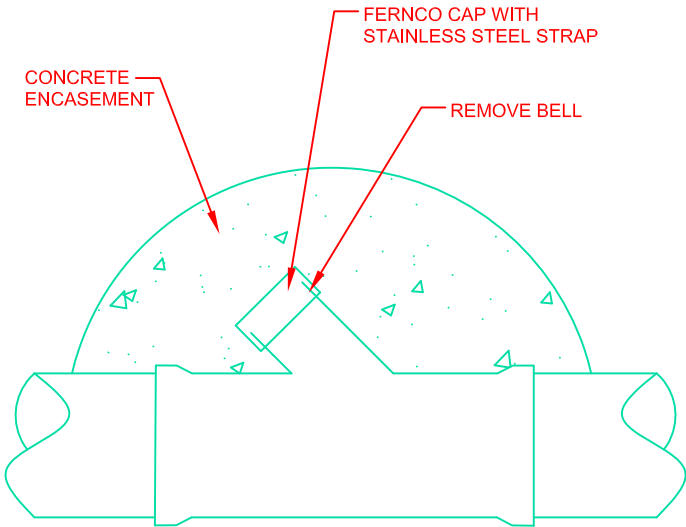
EXISTING HAMMER TAP LATERAL



EXISTING WYE FITTING LATERAL



ABANDONED HAMMER TAP LATERAL
(SEE NOTE #1)



ABANDONED WYE FITTING LATERAL

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: SEWER LATERAL ABANDONMENT



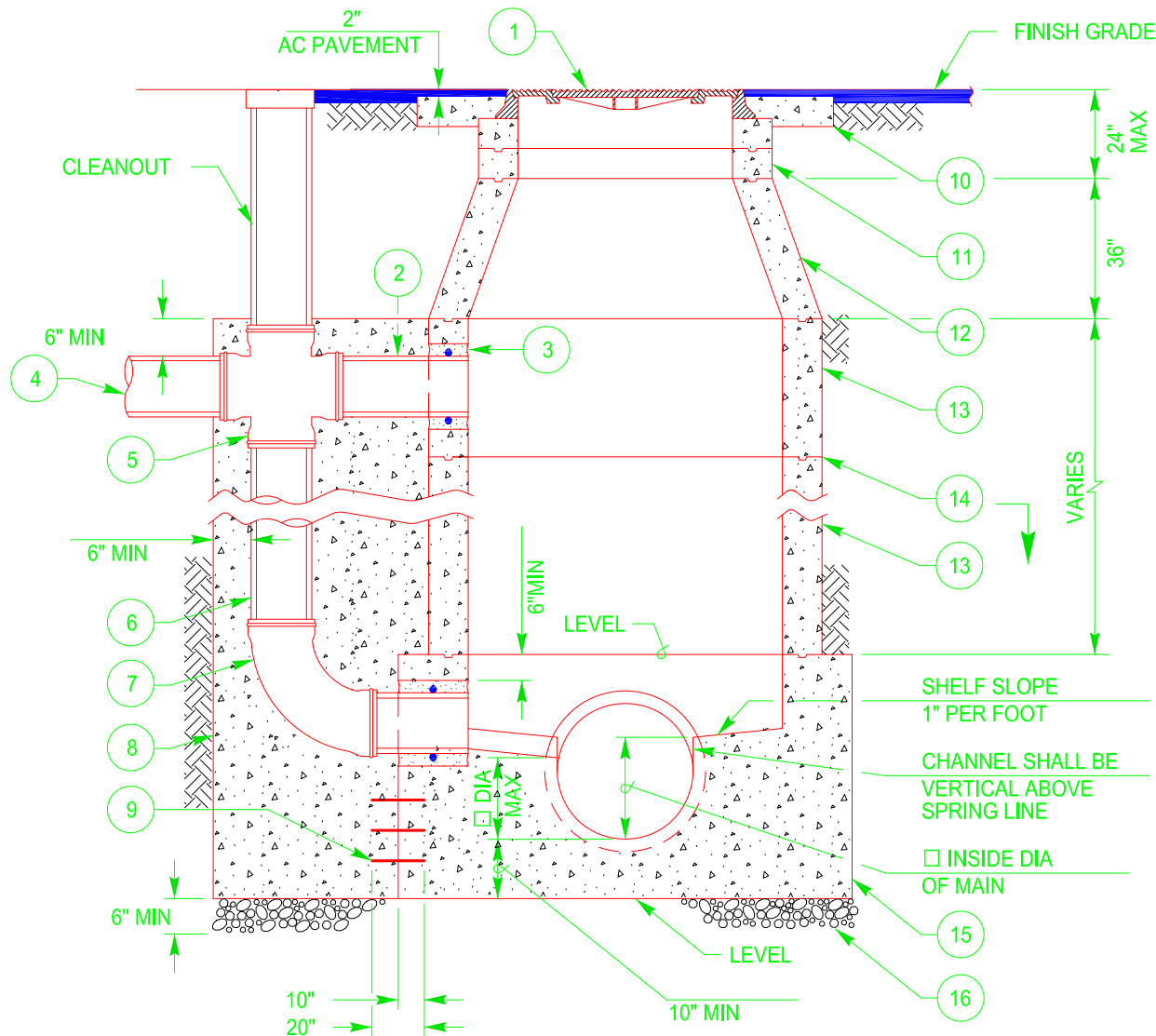
PALMETTO STATE UTILITY SERVICES, INC.
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Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS						
ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
		NEW SHEET	SFM	3-16-09		

SCALE:
NTS

DRAWING NUMBER
S17


Thursday, May 27, 2010



ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	24" MANHOLE FRAME AND TWO CONCENTRIC COVERS	10	6" HIGH x 12" WIDE CONCRETE RING
2	SIZE x 12" LONG SEWER PIPE	11	24" DIA GRADE RING(S) 6" TO 18" HIGH
3	MANHOLE PIPE CONNECTOR SEE S4	12	ECCENTRIC CONE
4	SEWER PIPE	13	48" DIA RING(S) VARIABLE HEIGHT
5	SIZE x SIZE GASKETED TEE	14	WATER TIGHT JOINTS
6	DROP SEWER PIPE AS REQUIRED	15	CONCRETE BASE, CAST IN PLACE OR PRECAST
7	SIZE x 90° GASKETED LONG RADIUS BEND	16	6" OF CRUSHED ROCK
8	CONCRETE ENCASEMENT		
9	#4 BARS @ 6" ON CENTER EPOXIED INTO EXISTING MANHOLE BASE		

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: OUTSIDE DROP MANHOLE



PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207

Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS						
ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
		NEW SHEET	SFM	3-16-09		

SCALE: NTS

DRAWING NUMBER S18

Thursday, May 27, 2010

STANDARD CONSTRUCTION SPECIFICATIONS FOR WATER SYSTEMS

THIS SHOULD BE USED AS A GENERAL GUIDE. SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL REGULATIONS R.61-58 SHALL BE USED FOR SPECIFIC DESIGN CRITERIA. THE INFORMATION REQUIRED BY R.61-58 INCLUDES THE APPROPRIATE SECTION FOR REFERENCE.

GENERAL REQUIREMENTS:

- CONSTRUCTION SPECIFICATIONS MUST BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER. THE SPECIFICATIONS SHOULD INCLUDE THE ENGINEERING FIRM'S CORPORATE SEAL ALONG WITH THE SEAL AND SIGNATURE OF ALL ENGINEERS OF THE FIRM UTILIZING THESE SPECIFICATIONS. (R.61-58.1.F)
- ALL STANDARDS CITED IN THE TEXT REFER TO THE LATEST REVISION OF THAT STANDARD UNDER THE SAME SPECIFICATION NUMBER OR TO SUPERSEDING SPECIFICATIONS UNDER A NEW NUMBER.

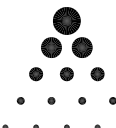
MATERIALS REQUIREMENTS:

- ALL MATERIAL OR PRODUCTS WHICH COME INTO CONTACT WITH DRINKING WATER SHALL BE THIRD PARTY CERTIFIED AS MEETING THE SPECIFICATIONS OF THE AMERICAN NATIONAL INSTITUTE/NATIONAL SANITATION FOUNDATION STANDARD 61, DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS. THE CERTIFYING PARTY SHALL BE ACCREDITED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE. (R.61-58.4.D.(1))
- ALL PIPE, FITTINGS, PACKING, JOINTING MATERIALS, VALVES AND FIRE HYDRANTS SHALL CONFORM TO SECTION C OF THE AWWA STANDARDS. (R.61-58.4.D.(1))
- WATER MAINS WHICH HAVE BEEN PREVIOUSLY USED FOR CONVEYING POTABLE WATER MAY BE REUSED PROVIDED THEY MEET APPLICABLE CRITERIA FROM AWWA SECTION C, ANSI/NSF 61, AND ASTM D1785 OR D2241. THE MAINS MUST BE THOROUGHLY CLEANED AND RESTORED PRACTICALLY TO THEIR ORIGINAL CONDITION. (R.61-58.4.D.(2))
- ASBESTOS CEMENT PIPE SHALL NOT BE USED IN POTABLE WATER SYSTEMS EXCEPT IN THE REPAIR OF EXISTING ASBESTOS CEMENT LINES. (R.61-58.4.D.(1))
- THERMOPLASTIC PIPE SHALL NOT BE USED ABOVE GRADE. (R.61-58.4.D.(1))
- MATERIALS SHALL MEET THE FOLLOWING:
 - DIP: AWWA C150/A21.50 & AWWA C151/A21.51.
 - PVC: AWWA C900 (FOR PIPES 4 INCHES THROUGH 12 INCHES IN DIAMETER).
 - PVC: ASTM D1785 OR ASTM D2241: SD 26 CLASS 160 AND SD 21 CLASS 200 (FOR PIPES 12 INCHES IN DIAMETER AND SMALLER).
 - PVC: AWWA C905 (FOR PIPES 14 INCHES THROUGH 48 INCHES IN DIAMETER).
 - STEEL: AWWA C200 OR ASTM A53 OR A120.
 - VALVES: AWWA C500 (METAL SEATED GATE VALVE) , C504 (BUTTERFLY VALVE) OR C509 (RESILIENT SEATED GATE VALVE).
 - HYDRANTS: AWWA C502.
- NATURAL RUBBER OR OTHER MATERIAL WHICH WILL SUPPORT MICROBIOLOGICAL GROWTH MAY NOT BE USED FOR ANY GASKETS, O-RINGS, AND OTHER PRODUCTS USED FOR JOINTING PIPES, SETTING METERS OR VALVES, OR OTHER APPURTENANCES WHICH WILL EXPOSE THE MATERIAL TO THE WATER. (R.61-58.4.D.(3))
- LUBRICANTS WHICH WILL SUPPORT MICROBIOLOGICAL GROWTH SHALL NOT BE USED FOR SLIP-ON JOINTS. (R.61-58.4.D.(3))
- THE USE OF VEGETABLE SHORTENING IS PROHIBITED. (R.61-58.4.D.(3))
- THE USE OF SOLVENT-WELD PVC PIPE AND FITTINGS IN WATER MAINS 4 INCHES AND LARGER IS PROHIBITED. (R.61-58.4.D.(3))
- ANY PIPE, SOLDER, OR FLUX WHICH IS USED IN THE INSTALLATION OR REPAIR OF ANY PUBLIC WATER SYSTEM, USED IN ANY PLUMBING WHICH PROVIDES WATER THROUGH CONNECTION TO A PUBLIC WATER SYSTEM, FOR HUMAN CONSUMPTION, SHALL BE LEAD FREE. LEAD FREE, FOR SOLDER AND FLUX, MEANS THOSE CONTAINING NOT MORE THAN 0.2% LEAD. LEAD FREE, FOR PIPES AND PIPE FITTINGS, AS THOSE CONTAINING NOT MORE THAN 8.0% LEAD. LEADED JOINTS NECESSARY FOR THE REPAIR OF CIP SHALL BE EXEMPT FROM THE ABOVE. (R.61-58.4.F.(1)-(5))

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

WATER NOTES

 <div>PALMETTO STATE UTILITY SERVICES, INC. A Subsidiary of American States Utility Services, Inc. Building 2576, Essayons Way Fort Jackson, SC 29207 Tel: (803) 790-7288 Fax: (803) 787-2054</div>	REVISIONS						SCALE: NTS DRAWING NUMBER W1
	ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
			ADDED SCDHEC REQUIREMENTS	SFM	3-16-09		

Thursday, May 27, 2010

INSTALLATION REQUIREMENTS:

- ☐ NO FLUSHING DEVICE SHALL BE DIRECTLY CONNECTED TO ANY SEWER. (R.61-58.4.D.(7)(F))
- ☐ AIR RELIEF VALVES SHALL BE PROVIDED IN ACCORDANCE WITH SOUND ENGINEERING PRACTICE AT HIGH POINTS IN WATER MAINS AS REQUIRED. AUTOMATIC AIR RELIEF VALVES SHALL NOT BE USED IN SITUATIONS WHERE FLOODING OF THE MANHOLE OR CHAMBER MAY OCCUR. (R.61-58.4.D.(10)(A))
- ☐ CHAMBERS, PITS OR MANHOLES CONTAINING VALVES, BLOW-OFFS, METERS, AIR RELIEF VALVES, OR OTHER SUCH APPURTENANCES TO A DISTRIBUTION SYSTEM, SHALL NOT BE CONNECTED DIRECTLY TO ANY STORM DRAIN OR SANITARY SEWER. (R.61-58.4.D.(10)(C))
- ☐ INSTALLATION OF WATER MAINS AND APPURTENANCES SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION C OF THE AWWA STANDARDS AND/OR MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES. (R.61-58.4.D.(11)(A))
- ☐ BEDDING: (R.61-58.4.D.(11)(B))

☐ A CONTINUOUS AND UNIFORM BEDDING SHALL BE PROVIDED IN THE TRENCH FOR ALL BURIED PIPE.

☐ BACK-FILL MATERIAL SHALL BE TAMPED IN LAYERS AROUND THE PIPE AND TO A SUFFICIENT HEIGHT ABOVE THE PIPE TO ADEQUATELY SUPPORT AND PROTECT THE PIPE.

☐ STONES, OTHER THAN CRUSHED BEDDING, SHALL NOT COME IN CONTACT WITH THE PIPE AND SHALL NOT BE WITHIN 6 INCHES OF THE PIPE.
- ☐ ALL WATER MAINS SHALL BE PROVIDED WITH A MINIMUM OF 30 INCHES OF COVER, UNLESS PIPE MATERIAL IS STEEL, CONCRETE, DIP, OR OTHER APPROVED MATERIAL, AND IF EXPOSED SHOULD BE INSULATED TO PREVENT FREEZING. (R.61-58.4.D.(11)(C))
- ☐ ALL TEES, BENDS, PLUGS AND HYDRANTS ON LINES 2.5 INCHES IN DIAMETER AND LARGER SHALL BE PROVIDED WITH REACTION BLOCKING, TIE RODS, OR OTHER APPROVED METHOD OF RESTRAINT. (R.61-58.4.D.(11)(D))
- ☐ ALL WATER MAINS SHALL BE DETECTABLE WITHIN 3 FEET WITH ELECTRONIC LOCATING EQUIPMENT. (R.61-58.4.D.(11)(G))
- ☐ NON-METALLIC PIPES SHALL BE INSTALLED WITH COPPER WIRE OR OTHER MEANS OF DETECTION. (R.61-58.4.D.(11)(G))
- ☐ WATER MAINS SHALL BE LOCATED OUT OF CONTAMINATED AREAS, UNLESS USING PIPE MATERIALS THAT WILL PROTECT (I.E., DIP WITH CHEMICAL RESISTANT GASKETS). RE-ROUTE LINE IF POSSIBLE. (R.61-58.4.D.(11)(H))
- ☐ SEPARATION OF WATER MAINS AND SEWERS: (R.61-58.4.D.(12)(A)-(F))

☐ PARALLEL INSTALLATION: WATER MAINS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED SEWER. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN A TEN FOOT SEPARATION, THE DEPARTMENT MAY ALLOW DEVIATION ON A CASE-BY-CASE BASIS, IF SUPPORTED BY DATA FROM THE DESIGN ENGINEER. SUCH DEVIATION MAY ALLOW INSTALLATION OF THE WATER MAIN CLOSER TO A SEWER, PROVIDED THAT THE WATER MAIN IS LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.

☐ CROSSINGS: WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL SEPARATION OF 18 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHETHER THE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER LINE. WHENEVER POSSIBLE, THE WATER MAIN SHALL BE LOCATED ABOVE THE SEWER LINE. WHERE A NEW WATER MAIN CROSSES A NEW SEWER LINE, A FULL LENGTH OF PIPE SHALL BE USED FOR BOTH THE WATER MAIN AND SEWER LINE AND THE CROSSING SHALL BE ARRANGED SO THAT THE JOINTS OF EACH LINE WILL BE AS FAR AS POSSIBLE FROM THE POINT OF CROSSING AND EACH OTHER. WHERE A NEW WATER MAIN CROSSES AN EXISTING SEWER LINE, ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE SEWER LINE AS POSSIBLE. WHERE A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER LINE TO PREVENT DAMAGE TO THE WATER MAIN.

☐ SPECIAL CONDITIONS: WHEN IT IS IMPOSSIBLE TO OBTAIN THE DISTANCES SPECIFIED IN R.61-58.4(D)(12)(A) AND (B) THE DEPARTMENT MAY ALLOW AN ALTERNATIVE DESIGN. ANY ALTERNATIVE DESIGN SHALL:

☐ MAXIMIZE THE DISTANCES BETWEEN THE WATER MAIN AND SEWER LINE AND THE JOINTS OF EACH;

☐ USE MATERIALS WHICH MEET THE REQUIREMENTS R.61-58.4(D)(1) FOR THE SEWER LINE; AND,

☐ ALLOW ENOUGH DISTANCE TO MAKE REPAIRS TO ONE OF THE LINES WITHOUT DAMAGING THE OTHER.

☐ FORCE MAINS: THERE SHALL BE AT LEAST A 10 FOOT HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY SEWER FORCE MAINS. THERE SHALL BE AN 18 INCH VERTICAL SEPARATION AT CROSSING AS REQUIRED IN R.61-58.4(D)(12)(A) AND (B).

☐ SEWER MANHOLES: NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER MANHOLE. WATER LINES MAY COME IN CONTACT WITH STORM SEWERS OR CATCH BASINS IF THERE IS NO OTHER PRACTICAL ALTERNATIVE, PROVIDED THAT DUCTILE IRON IS USED, NO JOINTS OF THE WATER LINE ARE WITHIN THE STORM SEWER OR CATCH BASIN AND THE JOINTS ARE LOCATED AS FAR AS POSSIBLE FROM THE STORM SEWER OR CATCH BASIN.

☐ DRAIN-FIELDS AND SPRAY-FIELDS: POTABLE WATER LINES SHALL NOT BE LAID LESS THAN 25 FEET HORIZONTALLY FROM ANY PORTION OF A WASTE-WATER TILE-FIELD OR SPRAY-FIELD, OR SHALL BE OTHERWISE PROTECTED BY AN ACCEPTABLE METHOD APPROVED BY THE DEPARTMENT.

☐ ABOVE-WATER CROSSINGS: THE PIPE SHALL BE ADEQUATELY SUPPORTED AND ANCHORED, PROTECTED FROM DAMAGE AND FREEZING, ACCESSIBLE FOR REPAIR OR REPLACEMENT. (R.61-58.4.D.(13)(A))
- ☐ UNDERWATER CROSSINGS: A MINIMUM OF 2 FEET OF COVER SHALL BE PROVIDED OVER THE PIPE. WHEN CROSSING WATER COURSES THAT ARE GREATER THAN 15 FEET IN WIDTH, THE FOLLOWING SHALL BE PROVIDED: (R.61-8.4.D.(13)(B)(I)-(III))

☐ THE PIPE MATERIAL AND JOINTS SHALL BE DESIGNED APPROPRIATELY.

☐ VALVES SHALL BE LOCATED SO THE SECTION CAN BE ISOLATED FOR TESTING OR REPAIR; THE VALVES (ON BOTH SIDES OF CROSSING) SHALL BE EASILY ACCESSIBLE AND NOT SUBJECT TO FLOODING.

☐ A BLOW-OFF SHALL BE PROVIDED ON THE SIDE OPPOSITE THE SUPPLY SERVICE SIZED IN ACCORDANCE WITH SECTION R.61-58.4.(D)(7). DIRECT AWAY FROM STREAMS, OVER GROUND.

☐ USE DIP WITH MECHANICAL JOINTS FOR ANY LINES BEING INSTALLED IN ROCK.

- ☐ Cross Connection Control (Backflow Prevention Devices):
- ☐ There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contamination materials may be discharged or drawn into the system. (R.61-58.4.D.(14)(a))

☐ No by-passes shall be allowed, unless the bypass is also equipped with an equal, approved back-flow prevention device. (R.61-58.4.D.(14)(a))

☐ High hazard category cross connections shall require an air gap separation or an approved reduced pressure backflow preventer. (R.61-58.7.F.(4))

☐ Reduced pressure principal backflow prevention assemblies shall not be installed in any area location subject to possible flooding. This includes pits or vaults which are not provided with a gravity drain to the ground's surface that is capable of exceeding the discharge rate of the relief valve. Generally, if installed in a pit, the drain line shall be 2 times the size of the line entering the backflow prevention device. The drain cannot empty into any type of ditch, storm drain, or sewer, which could flood water back into the pit. (R.61-58.7.F.(5))

☐ All piping up to the inlet of the backflow prevention device must be suitable for potable water. The pipe must be AWWA or NSF approved. Black steel pipe cannot be used on the inlet side of the device.

☐ Fire line sprinkler systems and dedicated fire lines, except those in the high hazard category shall be protected by an approved double check valve assembly. (R.61-58.7.F.(6))

Testing & Disinfection Requirements: (SEE TECHNICAL PIPELINE SPECIFICATIONS)

Construction Details:

- ☐ Fire Hydrant details shall include the following:
- ☐ Hydrant leads shall be a minimum of 6 inches in diameter and shall include auxiliary gate valves. (R.61-58.4.D.(9)(a)(i))

☐ A gravel pocket or dry well shall be provided unless the natural soils will provide adequate drainage. (R.61-58.4.D.(9)(a)(ii))

☐ Hydrant drains shall not be connected to or located within 10 feet of sewer systems. (R.61-58.4.D.(9)(a)(iii))

☐ Thrust blocking should not block weep holes.
- ☐ Blow-off details shall include the following:
- ☐ Blow-offs should be located in a box or other structure to facilitate proper use. The orifice should be provided on the fixed piping, in the valve box.

☐ Blow-offs should not be directed towards roads or so that the water will flow into creeks, etc. At stream crossings direct away from streams, over ground.

☐ Orifice sized as follows:

Pipe Diameter:	Minimum Flow Required:	Orifice Size:
2 inch	25 gpm	0.75 inch
2.5 inch	40 gpm	1 inch
3 inch	60 gpm	1.25 inch
4 inch	100 gpm	1.5 inch
6 inch	220 gpm	2 inch
8 inch	400 gpm	2.5 inch
10 inch	612 gpm	Fire Hydrant
12 inch	882 gpm	Fire Hydrant
14 inch	1200 gpm	Special Blow-off
16 inch	1570 gpm	Special Blow-off

☐ Air Relief Valves details shall include the following:

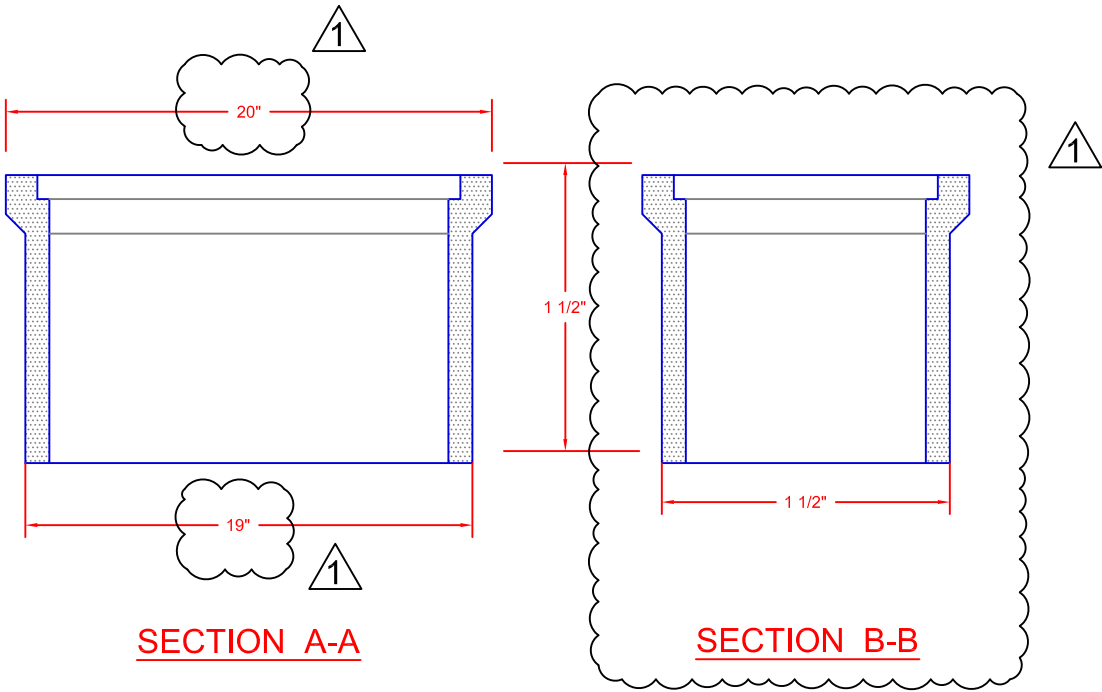
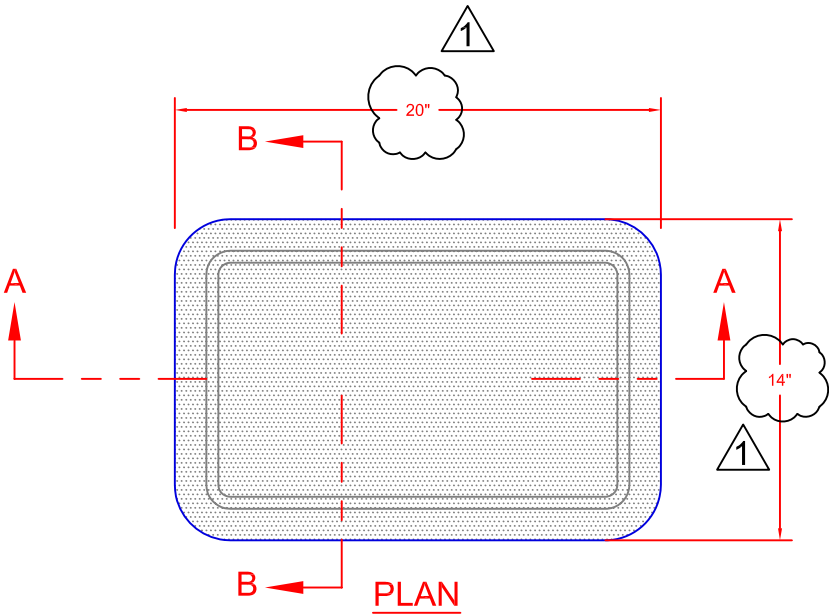
☐ The open end of an air relief pipe from automatic valves or from a manually operated valve shall be extended to the top of the pit and provided with a screened downward facing elbow. (R.61-58.4.D.(10)(b))

☐ Thrust Blocking details.

NOTE: Stream Crossings and Backflow Prevention Device details, if applicable, should be included with each project.

GENERAL NOTES:

1. MATERIAL SHALL BE CONCRETE/POLYMER.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
3. ACCEPTABLE MANUFACTURERS ARE AS FOLLOWS:
BROOKS MODEL 37 MB
ARMORCAST MODEL P6000485, A6000485 OR A600048SSA
CARSON LLC MSBCF11 18-12XL
NEW BASIS WFB1220122 AOC OR APPROVED EQUAL
4. DIMENSIONS SHOWN ARE APPROXIMATE. FINAL DIMENSIONS SHALL BE BASED ON SELECTED MFR.
5. THIS DETAIL IS FOR 1-INCH WATER METERS. FOR ALL OTHER WATER METER SIZES REFER TO THE PSUS POTABLE WATER MATERIALS GUIDELINE.
6. BOX SHALL BE RATED FOR H2O LOADING.



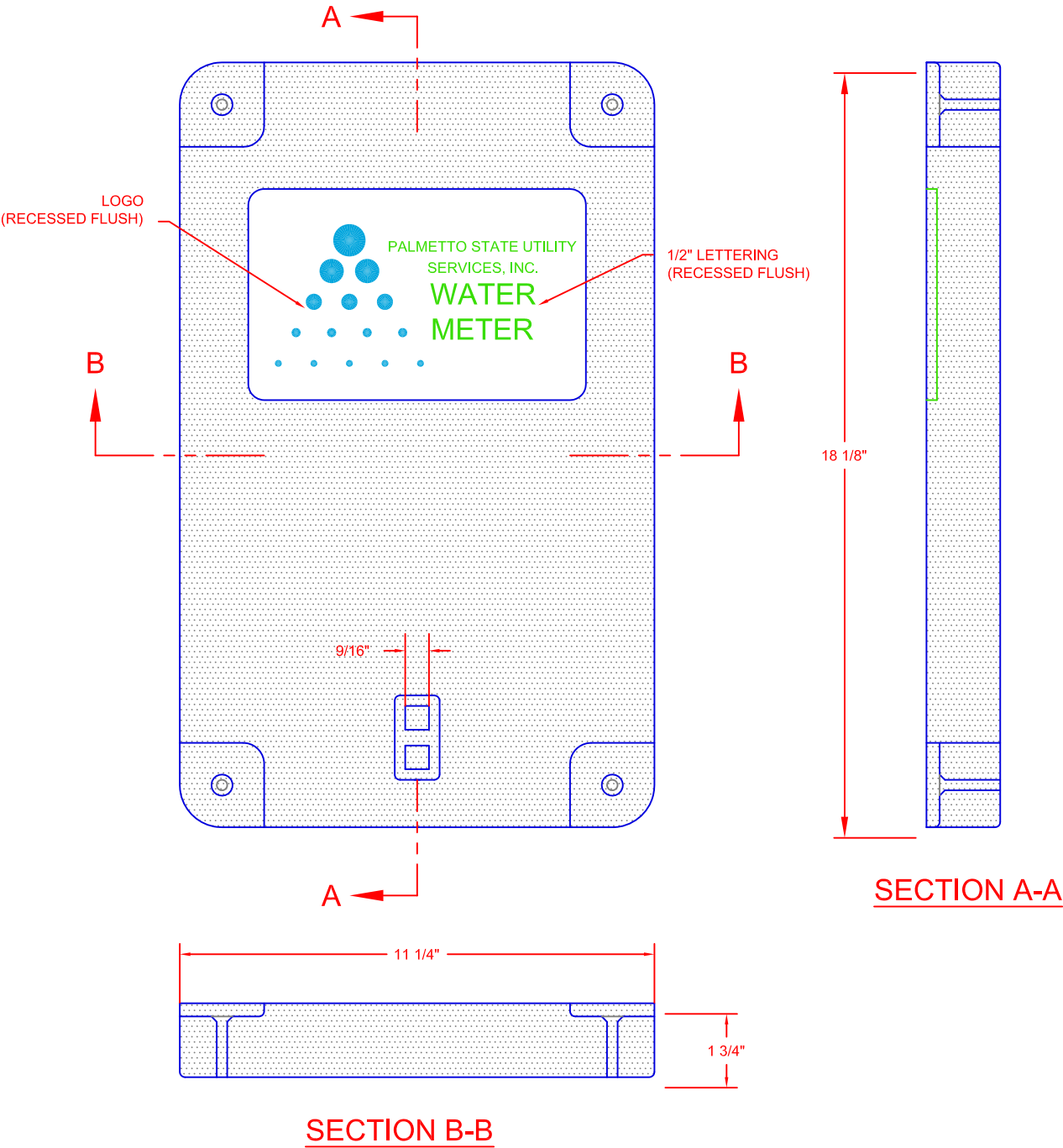
1. COVER AND LID SHALL BE POLYMER CONCRETE.

2. CASTING TO BE SMOOTH, AND VOID OF AIR HOLES.

3. METER LIDS AND COVERS SHALL BE AS FOLLOWS:
CARSON LLC MSBCF1118SPCPD COVER
MSCBC101 DROP IN LID.
NEW BASIS WPC1220B12A0A00 DROP IN COVER
WPC0509A02A0BWM DROP IN LID
ARMORCAST A6000484DQ DROP IN COVER
A6000487 DROP IN LID
A60000484 1 PC COVER
A6000484 1 PC COVER
BOOK 375 - LID AND COVER
4. DIMENSIONS SHOWN ARE APPROXIMATE. FINAL DIMENSIONS SHALL BE BASED ON MFR SELECTED.

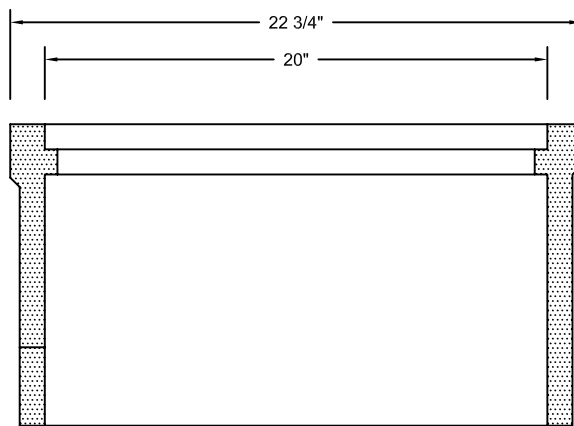
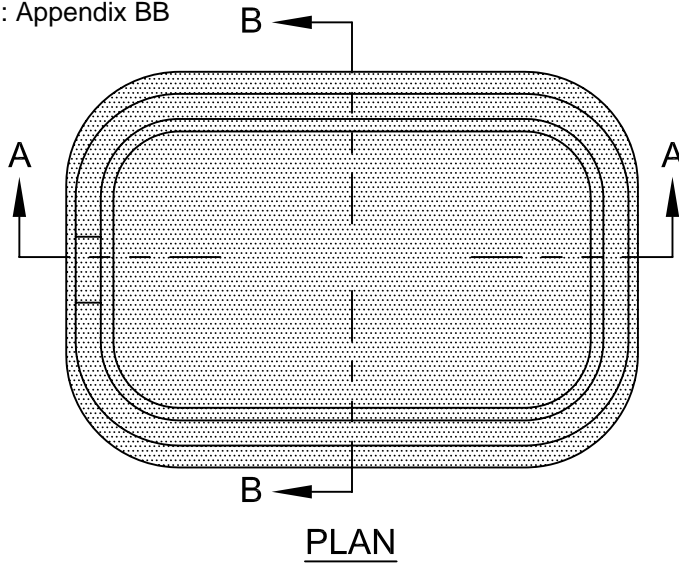
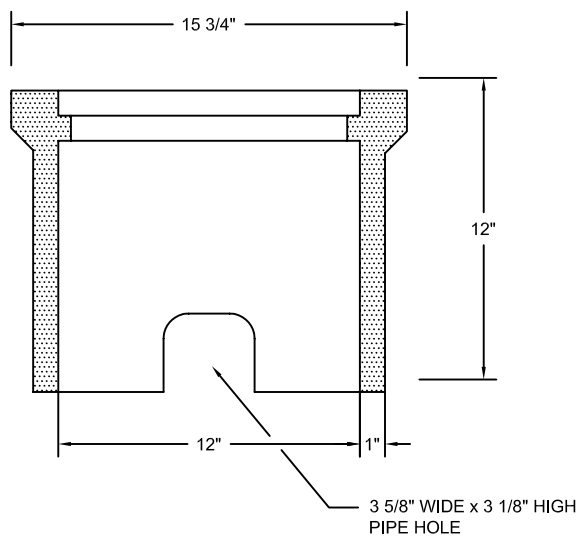
5. THIS DETAIL IS FOR 1-INCH WATER METERS. FOR ALL OTHER WATER METER SIZES REFER TO THE PALMETTO STATE UTILITY SERVICES POTABLE WATER MATERIALS GUIDELINE.

6. COVER SHALL BE RATED FOR H20 LOADING.



GENERAL NOTES:

1. MATERIAL SHALL BE CONCRETE/POLYMER.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
3. ACCEPTABLE MANUFACTURERS ARE AS FOLLOWS:
BROOKS MODEL 37 MB
ARMORCAST MODEL P6000485, A6000485 OR A600048SSA
CARSON LLC MSBCF11 18-12XL
NEW BASIS WFB1220122 AOC OR APPROVED EQUAL
4. DIMENSIONS SHOWN ARE APPROXIMATE. FINAL DIMENSIONS SHALL BE BASED ON SELECTED MFR.
5. THIS DETAIL IS FOR 1-INCH WATER METERS. FOR ALL OTHER WATER METER SIZES REFER TO THE PALMETTO STATE UTILITY SERVICES POTABLE WATER MATERIALS GUIDELINE.

**SECTION A-A**

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

1" WATER METER BOX (NON-TRAFFIC)

**PALMETTO STATE UTILITY
SERVICES, INC.**

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	REVISED SHEET NUMBER	SFM	3-16-09	

SCALE:

NTS

Thursday, May 27, 2010
W7

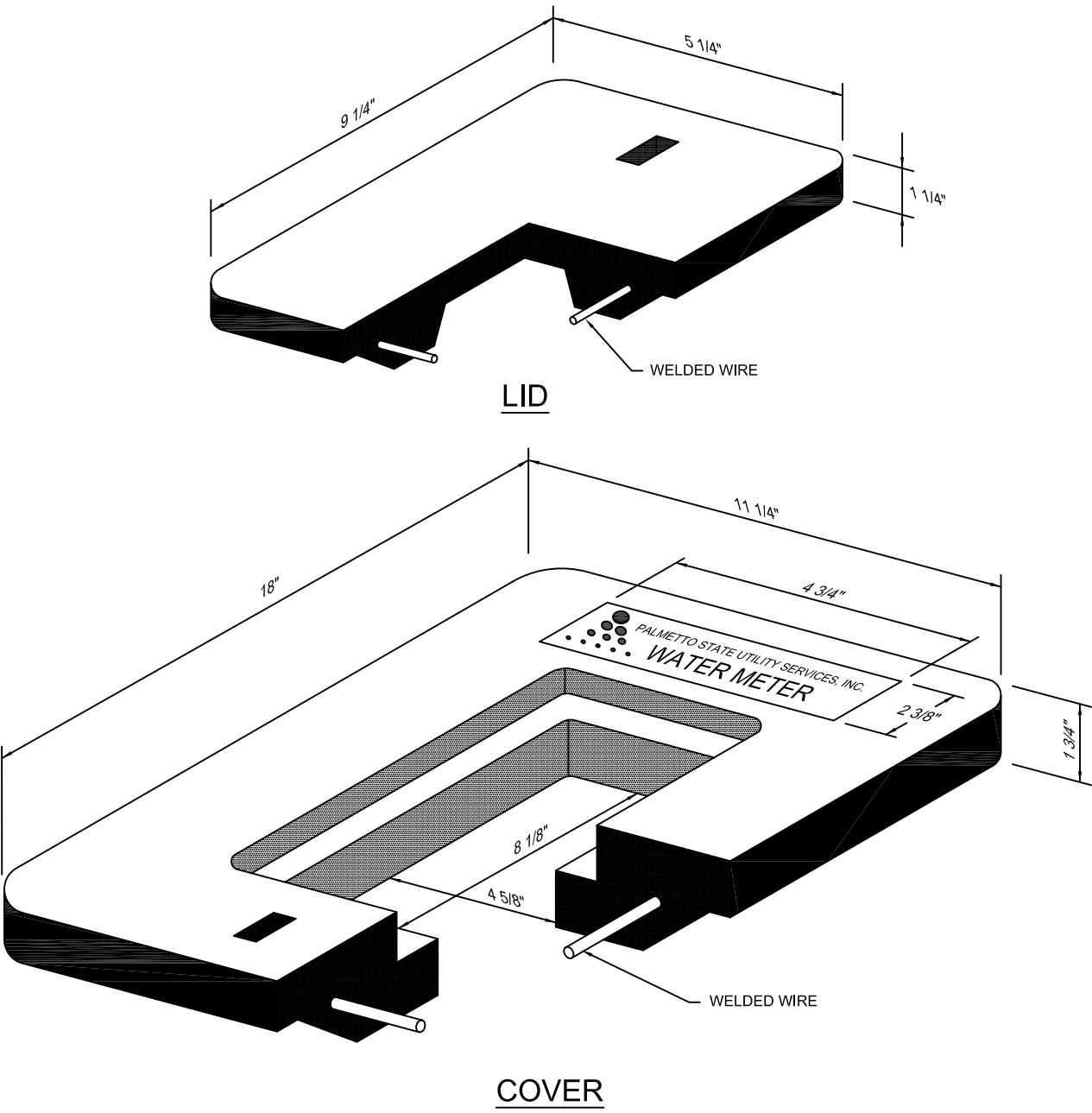
GENERAL NOTES:

1. METER BOX COVER AND LID SHALL BE POLYMER CONCRETE.

2. CASTING TO BE SMOOTH, AND VOID OF AIR HOLES.

3. METER LIDS AND COVERS SHALL BE AS FOLLOWS:
CARSON LLC MSBCF1118SPCPD COVER
MSCBC101 DROP IN LID.
NEW BASIS WPC1220B12A0A00 DROP IN COVER
WPC0509A02A0BWM DROP IN LID
ARMORCAST A6000484DQ DROP IN COVER
A6000487 DROP IN LID
A60000484 1 PC COVER
A6000484 1 PC COVER
BOOKS 375 - LID AND COVER
4. DIMENSIONS SHOWN ARE APPROXIMATE. FINAL DIMENSIONS SHALL BE BASED ON MFR SELECTED.

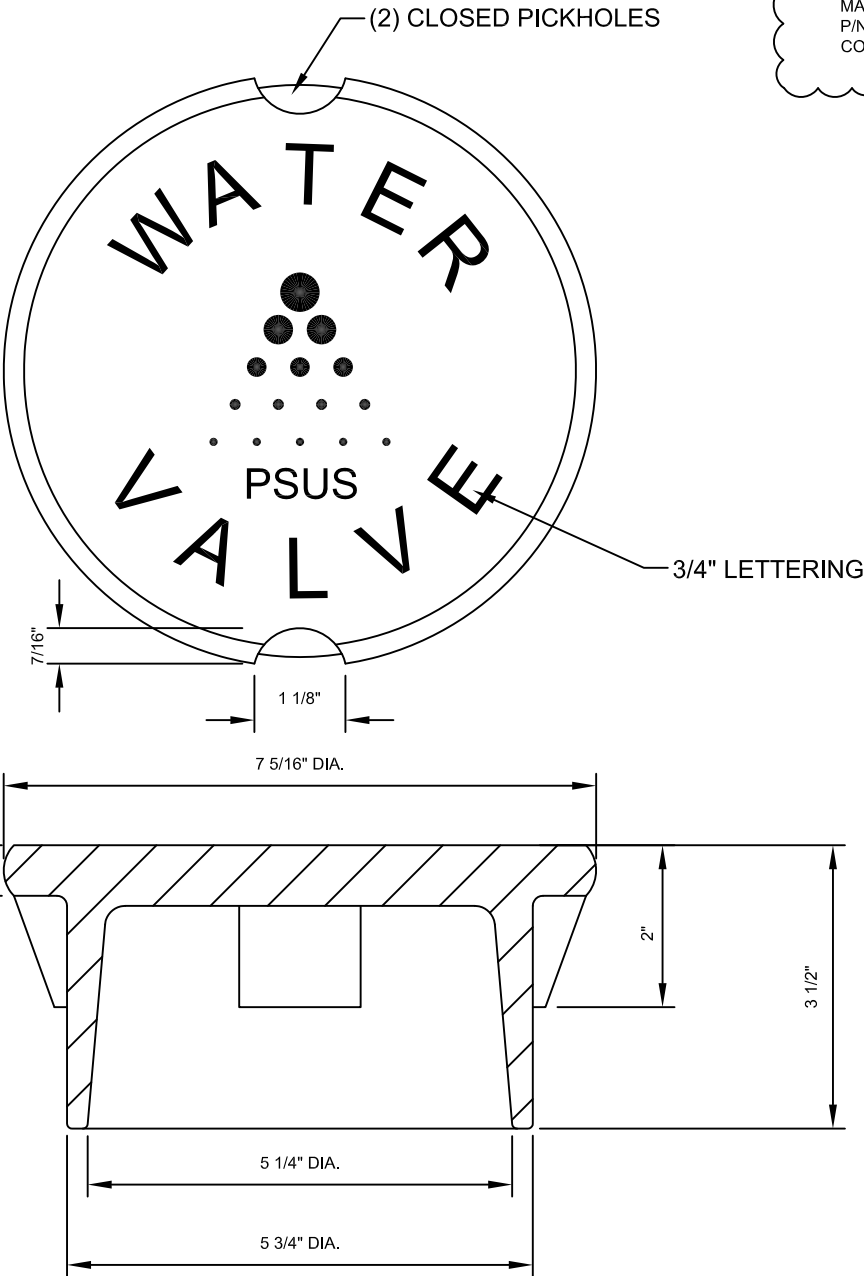
5. THIS DETAIL IS FOR 1-INCH WATER METERS. FOR ALL OTHER WATER METER SIZES REFER TO THE PSUS POTABLE WATER MATERIALS GUIDELINE.



GENERAL NOTES:

1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.

3. ORDER AS FOLLOWS:
MANUFACTURER: BINGHAM & TAYLOR CO.
P/N: CUL5LPVPSUD
CONTACT: BILL THOMAS (336) 283-8891 (P)
(336) 283-4309 (F)



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: VALVE BOX COVER



PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207

Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS						
ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
		ORIGINAL ISSUE DATE		6-11-08		
	1	INCLUDES OREDER INFORMATION	SFM	3-16-09		

SCALE:

NTS

DRAWING NUMBER

W9

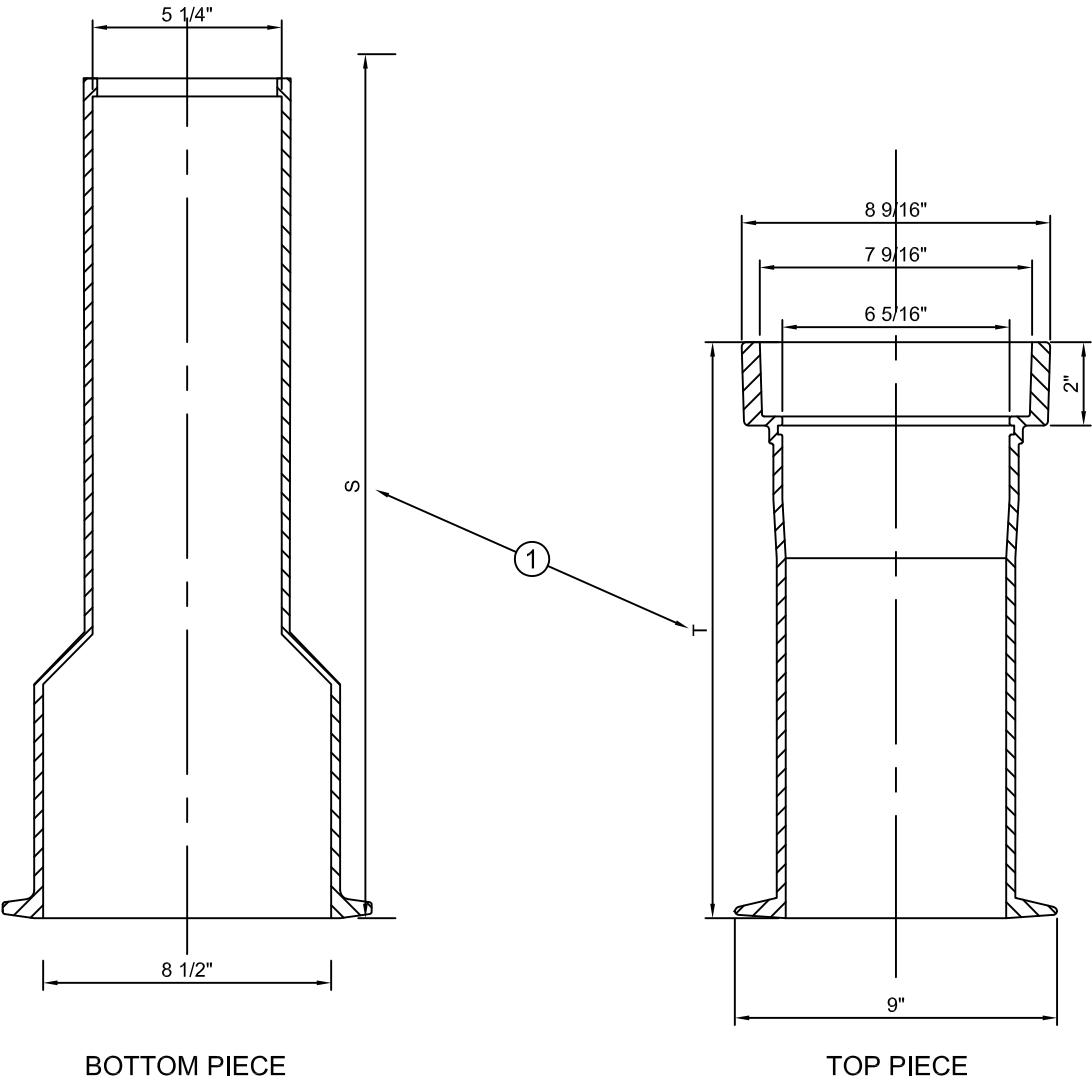
Thursday, May 27, 2010

GENERAL NOTES:

1. MATERIAL IS GRAY IRON CASTING. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
2. VALVE BOXES SHALL BE BINGHAM & TAYLOR CAST IRON 5-1/4" 2-PIECE SLIDING TYPE OR APPROVED EQUAL

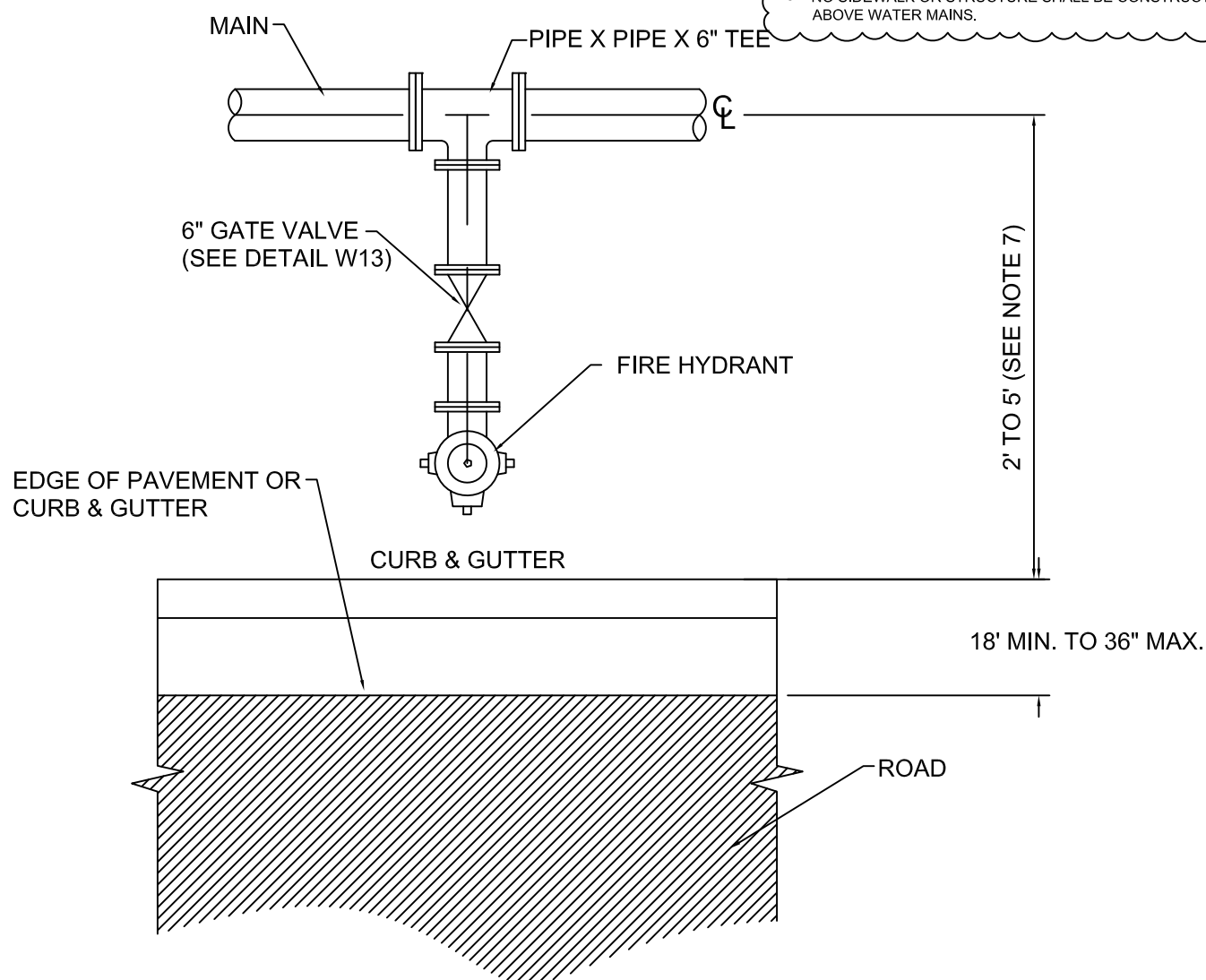
KEY NOTES:

1. DIMENSIONS "S" AND "T" VARY WITH DEPTH AND PART NUMBER ORDERED.



GENERAL NOTES:

1. FOR INSTALLATION OF FIRE HYDRANT SEE DETAIL W12.
2. ALL FIRE HYDRANTS SHALL BE MUELLER SUPER CENTURION A423 5 1/4" MAIN VALVE WITH MEGALUG FLANGES.
3. FIRE HYDRANT SHALL BE INSTALLED WITH THE 4 1/2" STEAMER CONNECTION FACING THE STREET.
4. NO OBSTRUCTION SHALL BE PERMITTED WITHIN A 6 FT. RADIUS OF THE FIRE HYDRANT. FIRE HYDRANT SHALL NOT BE PLACED IN A WHEEL CHAIR RAMPS, DRIVEWAYS BETWEEN HOUSES OR IN YARDS AND SHALL BE SPACED PER FORT JACKSON FIRE DEPARTMENT .
5. FIRE HYDRANTS SHALL BE INSTALLED AND LOCATED AT THE ENTRY OF THE HOUSING AREAS, INTERSECTIONS AND CUL-DE-SACS.
6. A LICENSED OR CERTIFIED CONTRACTOR SHALL INSTALL THE NEW FIRE HYDRANTS. NO BOLLARDS WILL BE INSTALLED AROUND THE FIRE HYDRANTS.
7. DISTANCE BETWEEN WATER MAIN AND FIRE HYDRANT MAY VARY WITH APPROVAL OF PSUS.
8. NO SIDEWALK OR STRUCTURE SHALL BE CONSTRUCTED ABOVE WATER MAINS.



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

FIRE HYDRANT LOCATIONS

PALMETTO STATE UTILITY
SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essavons Way Fort Jackson, SC 29207

Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP
		ORIGINAL ISSUE DATE		6-11-08	
	1	DEL. CASE 2; DEL. SIDEWALK; REV./ADD NOTES	SFM	3-16-09	

SCALF.

NTS

DRAWING NUMBER

W11

W11

Thursday, May 27, 2010

KEY NOTES:

- 1

PUMPER NOZZLE 4 1/2" TO BE FACING THE TRAVELED WAY, UNLESS OTHERWISE NOTED IN THE PLANS.
- 2

HOSE NOZZLE 2 1/2" - 2 EACH.
- 3

DRAIN PIT 3/8" PEA GRAVEL PLACE TO ABOVE F.H. SHOE TO ALLOW FOR WEEP HOLE DRAINAGE.
- 4

CONC. THRUST BLOCK, APPROX. 2'x2'x3' TO BE POURED AGAINST UNDISTURBED EARTH, F.H. **WEEP HOLE MUST BE UNOBSTRUCTED.**
- 5

NO. 5 REBAR HAIRPINS.
- 6

CONTRACTOR IS TO PROVIDE ADDITIONAL SPOOLS IF NEEDED TO MAINTAIN THE 18" MIN. TO 24" MAX. DISTANCE BETWEEN THE GROUND ELEVATION AND THE 4 1/2" PUMPER NOZZLE.
- 7

MINIMUM OF (4) 3/4" BITUMINOUS COATED TIE RODS. A VALVE AND HYDRANT TEE MAY BE USED IN LIEU OF TIE RODS.
- 8

SEE GATE VALVE DETAIL W15.
- 9

WEEP HOLES
- 10

ANCHOR BLOCK AND HAIRPINS - SEE DRAWING W33

GENERAL NOTES:

- 1

ALL FIRE HYDRANTS SHALL BE MUELLER SUPER CENTURION A423 5 1/4" MAIN VALVE WITH MEGALUG FLANGES.
- 2

FIRE HYDRANT SHALL BE INSTALLED WITH THE 4 1/2" STREAMER CONNECTION FACING THE STREET.
- 3

NO OBSTRUCTION SHALL BE PERMITTED WITHIN A 6 FT. RADIUS OF THE FIRE HYDRANT. FIRE HYDRANT **SHALL NOT BE PLACED IN A WHEEL CHAIR RAMPS, DRIVEWAYS, BETWEEN HOUSES OR IN YARDS AND SHALL BE SPACED PER FORT JACKSON DIRECTORATE OF EMERGENCY SERVICES REQUIREMENTS.**
- 4

FIRE HYDRANTS SHALL BE INSTALLED AND LOCATED AT THE ENTRY OF THE HOUSING AREAS, INTERSECTIONS AND CUL-DE-SACS.
- 5

BOLLARDS MAY BE INSTALLED ON A CASE BY CASE BASIS.
- 6

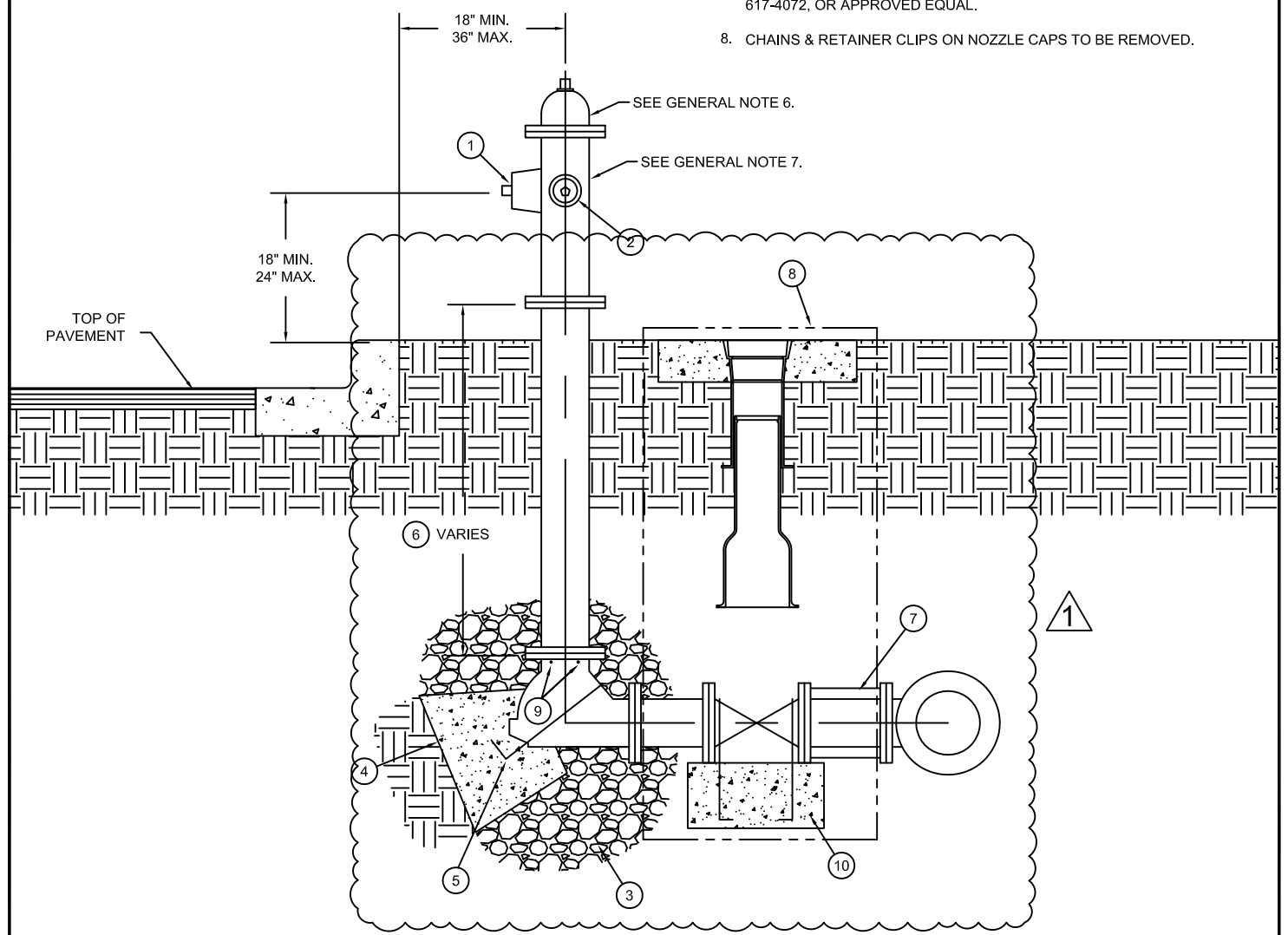
THE FIRE HYDRANT'S BONNET & BELL SHALL BE PAINTED AS FOLLOWS:

CLASS AA	LIGHT BLUE	GREATER THAN 1,500 GPM
CLASS A	GREEN	1,000-1,499 GPM
CLASS B	ORANGE	500-999 GPM
CLASS C	RED	LESS THAN 500 GPM

(ALL ABOVE TO INCLUDE REFLECTIVE MATERIAL)
- 7


THE FIRE HYDRANT'S BODY SHALL BE PAINTED SAFETY / CHROME YELLOW SHERWIN WILLIAMS - INDUSTRIAL & MARINE COATINGS, INDUSTRIAL ENAMEL "ALKYD COATING", NUMBER B54 Y 37 / 617-4072, OR APPROVED EQUAL.
- 8

CHAINS & RETAINER CLIPS ON NOZZLE CAPS TO BE REMOVED.



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: FIRE HYDRANT INSTALLATION



PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207

Tel: (803) 790-7288 Fax: (803) 787-2054

ZONE		REV.	DESCRIPTION	BY	DATE	APP.
		1	REV. CONFIG.; ADD THRUST BLOCK; REV. NOTES	SFM	3-16-09	

SCALE: NTS

DRAWING NUMBER W12

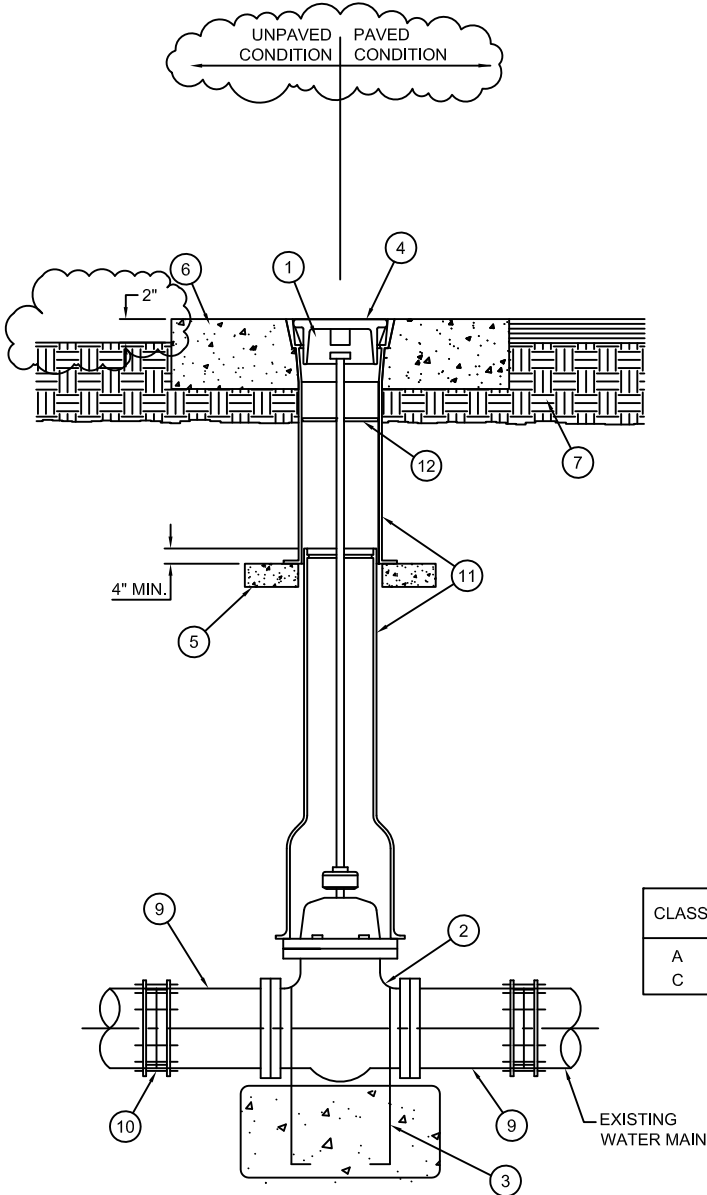
Thursday, May 27, 2010

GENERAL NOTES:

1. VALVE SHALL BE DUCTILE IRON AND ENDS SHALL BE MECHANICAL TYPE.
2. ALL BURIED VALVES SHALL BE PROVIDED WITH SOLID STEEL EXTENSION STEM OPERATOR WITH 2" SQUARE AWWA NUT WITHIN 36" OF VALVE BOX COVER. NUT IS TO INDICATE DIRECTION OF ROTATION TO OPEN VALVE.
3. IF STANDARD VALVE BOX IS NOT LONG ENOUGH TO COVER THE VALVE STEM, CONTRACTOR SHALL PROVIDE A 6" DIAMETER PIPE BETWEEN THE BOTTOM PIECE OF THE VALVE BOX AND THE GATE VALVE.
4. GATE VALVES WILL BE LOCATED AT INTERSECTIONS AS SHOWN AND SHALL NOT BE MORE THAN 500' APART.

KEY NOTES:

- 1
- 1 CLEAN VALVE BOX OF ALL DEBRIS AND SOIL.
- 2 COAT BURIED PIPE AND VALVE BOX W/COAL TAR EPOXY, VALVE SHALL BE WRAPPED IN POLYETHYLENE PLASTIC. GATE VALVE SHALL BE A RESILIENT SEAT MUELLER A-2361 W/AQUAGRIP SYSTEM OR APPROVED EQUAL.
- 3 3000 PSI CONCRETE VALVE SUPPORT (SEE TABLE BELOW) AND (2) #5 REBAR HAIRPINS. PAINT UNEMBEDDED PORTION WITH 2 COATS OF COAL TAR EPOXY.
- 4 STANDARD VALVE BOX COVER. SEE DETAIL W5.
- 5 MINIMUM 2 1/2" CONCRETE OR BRICKS ALL AROUND.
- 6 3000 PSI CONCRETE (SEE TABLE BELOW) 6" THICK BY 3" TO 4" IN DIAMETER FOR PAVED AREAS WITH STANDARD BASE COURSE MATERIAL, MAKE FLUSH WITH JMAC. FOR UNPAVED AREAS, TAPER EDGE AND RAISE 2" ABOVE ADJACENT GROUND SURFACE.
- 7 12" CEMENT STABILIZED BACKFILL IN PAVED AREAS.
- 8 NOT USED.
- 9 PROVIDE SPOOL PIECE AS REQUIRED.
- 10 SOLID SLEEVE AS REQUIRED.
- 11 STANDARD VALVE BOX. SEE DETAIL W6.
- 12 1/4" THICK STEEL TRASH RING. OD IS 1/8" SMALLER THAN ID OF VALVE BOX.




CLASS	AGGREGATE	WATER/CEMENT	MIN. CEMENT	FLY ASH	% AIR	WATER	MIN. 28-DAY
A	1 1/2"	.42	4.75	20	4±	YES	3000
C	3/4"	.43	5.0	20	6±	YES	3000

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

GATE VALVE DETAIL



PALMETTO STATE UTILITY SERVICES, INC.
A Subsidiary of American States Utility Services, Inc.
Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

ZONE		REV.	DESCRIPTION	BY	DATE	APP.
			ORIGINAL ISSUE DATE		6-11-08	
1			SHOW PAVED/UNPAVED CONDITION; NOTES	SFM	3-16-09	

SCALE:
NTS

DRAWING NUMBER
W13

Thursday, May 27, 2010

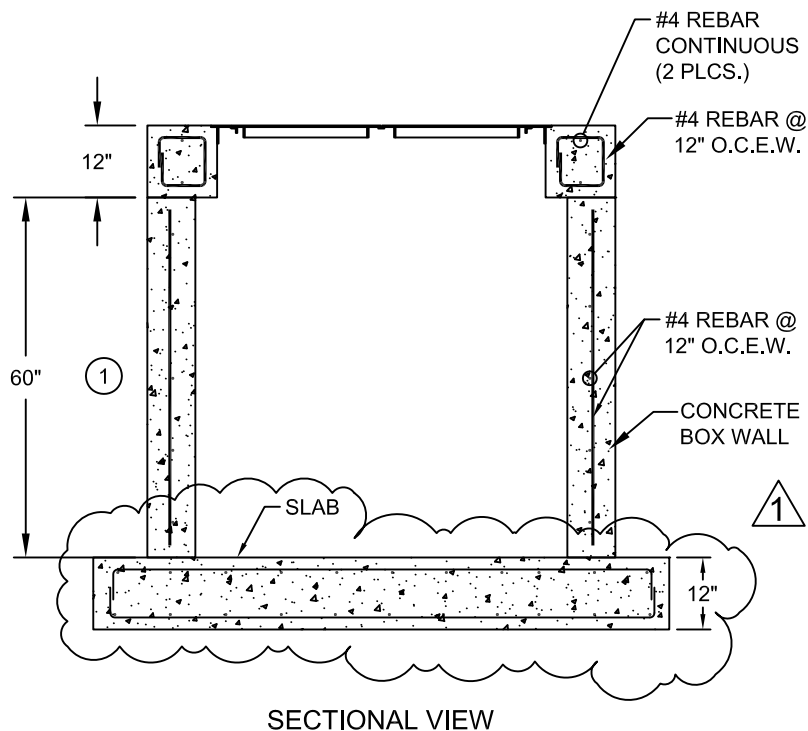
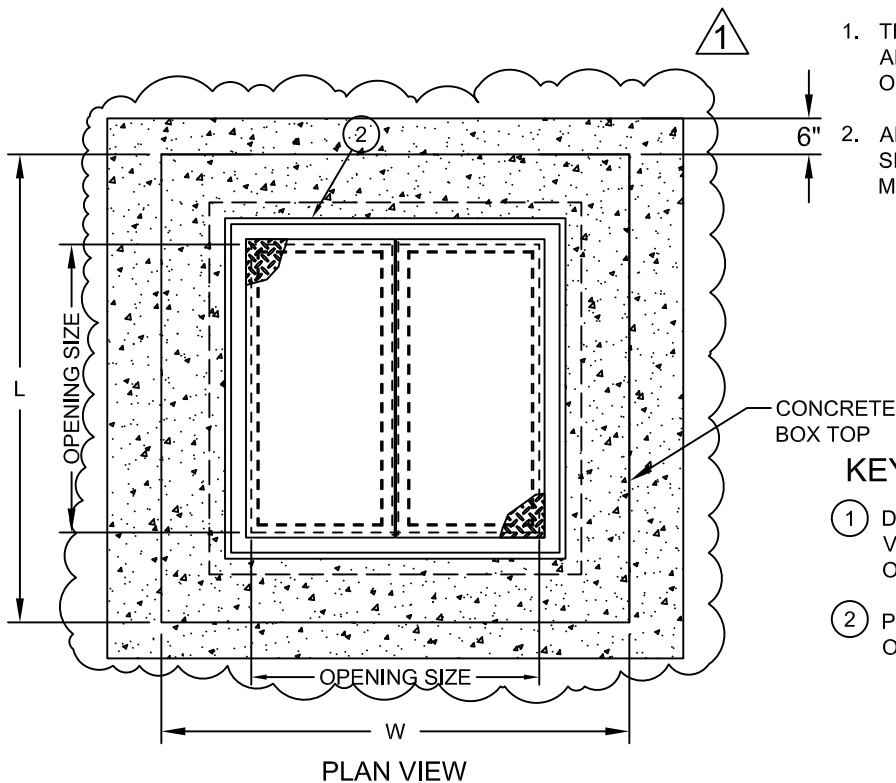
GENERAL NOTES:

1. THE PRE-CAST CONCRETE SHALL HAVE A MINIMUM ALLOWABLE COMPRESSIVE STRENGTH AT 28 DAYS OF 4000 PSI FOR THE TOP, WALLS AND FOOTINGS.
2. ALL JOINTS SHALL HAVE FLEXIBLE BUTYL RUBBER SEALANT. SEALANT SHALL CONFORM TO AASHTO M-198 AND FEDERAL SPECIFICATION SS-S-210A.

KEY NOTES:

- ① DIMENSION ON THE HEIGHT OF THE BOX MAY VARY TO FIT EXISTING CONDITIONS. MUST HAVE OWNER'S APPROVAL.
- ② PRODUCT SHALL BE BILCO MODEL KD-2 OR KD-3 OR APPROVED EQUAL. SEE TABLE BELOW.

2			
W	L	BILCO MODEL #	OPENING SIZE
6'-6"	6'-6"	KD-2	48" X 48"
6'-6"	7'-6"	KD-2	48" X 48"
6'-6"	8'-6"	KD-3	48" X 72"
6'-6"	9'-6"	KD-3	48" X 72"
6'-6"	10'-6"	KD-3	48" X 72"



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

CONCRETE BOXES W/ BILCO HATCH

PALMETTO STATE UTILITY
SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207

Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	REVISED TO PROVIDE SLAB	SFM	3-16-09	

SCALF.

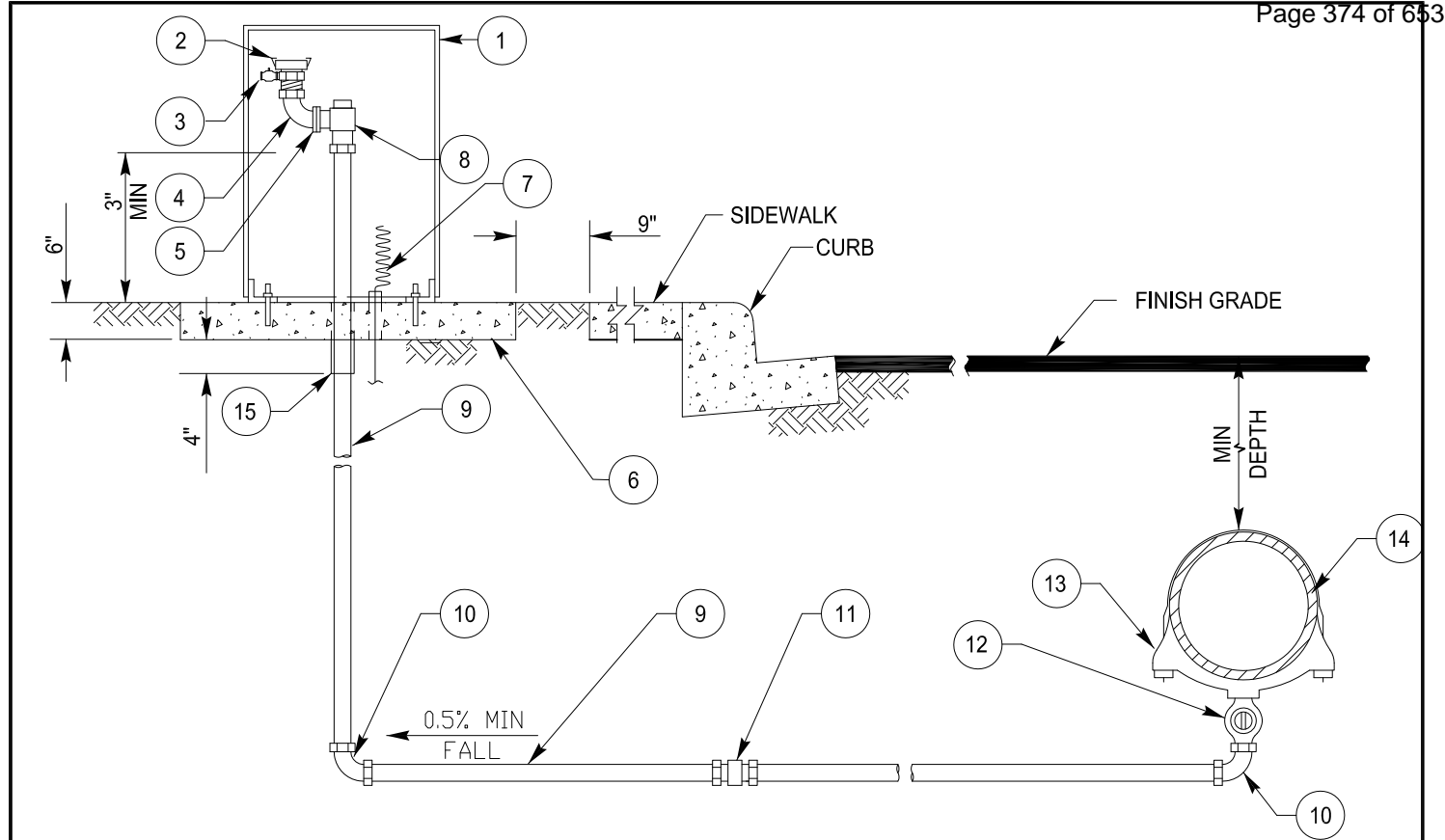
NTS

DRAWING NUMBER

W114

May 27

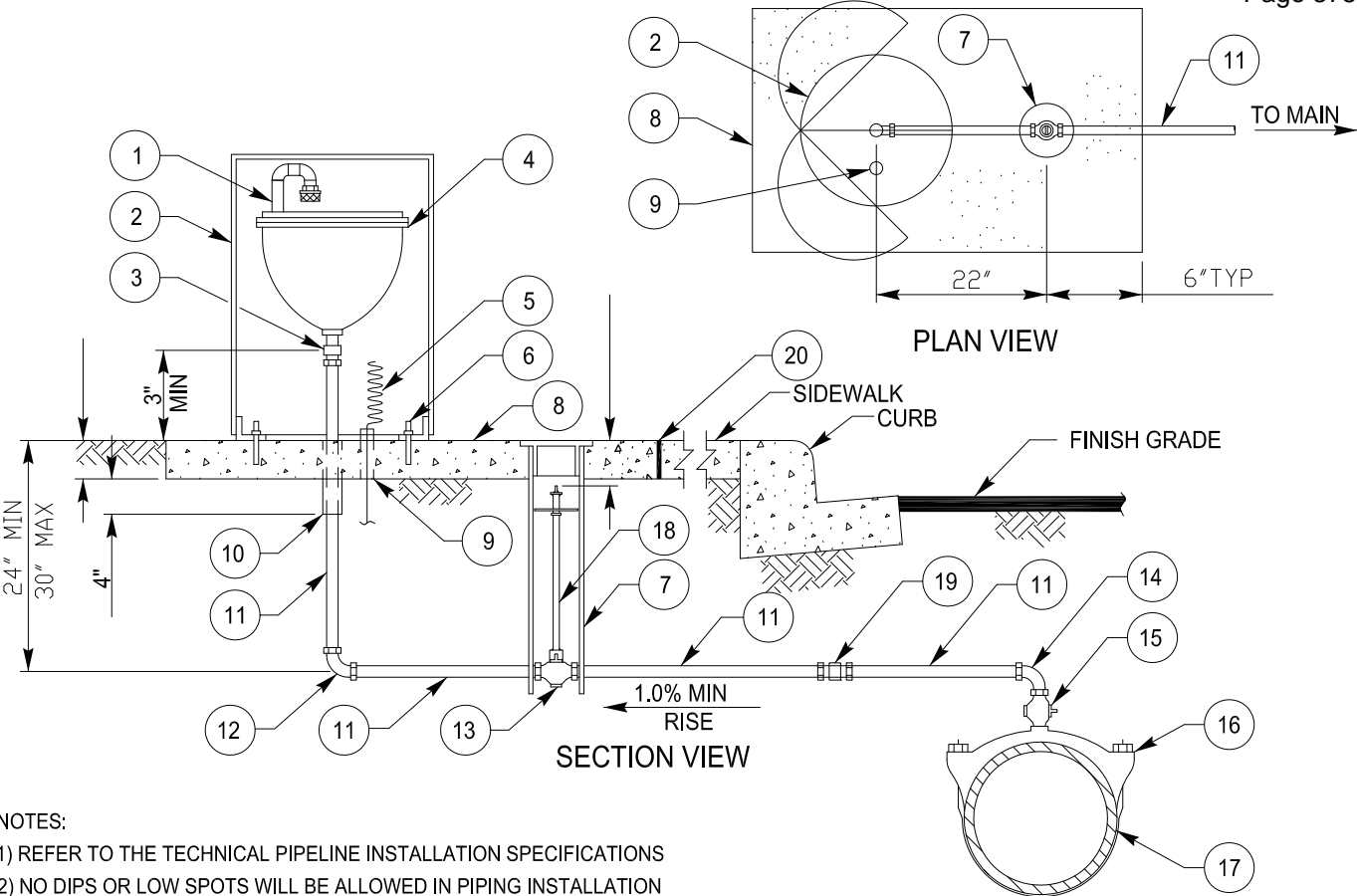
Thursday, May 27, 2010



- NOTES:
- 1) VALVE ENCLOSURE SHALL BE INSTALLED PER MANUFACTURER SPECIFICATIONS.
 - 2) MINIMUM DEPTH TO PIPE IS AS SHOWN ON DRAWING W4.
 - 3) INSTALL WARNING/IDENTIFICATION TAPE ABOVE ALL PIPING
 - 4) CAM & GROOVE FITTING ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK
 - 5) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST

1

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	VALVE ENCLOSURE	8	2" BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING
2	2" CAM & GROOVE FITTING ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 8	9	2" x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
3	□" PRESSURE PET COCK	10	2" 90° BRONZE COMPRESSION ELL
4	2" 90° BRONZE MIPT x FIPT ELL	11	2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
5	2" OVAL METER FLANGE FLG x FIPT, WITH GASKET	12	2" BRONZE MIPT x COMP CORP. STOP
6	30" X 30" X 6" CONCRETE SLAB	13	SIZE x 2" SERVICE SADDLE
7	TRACER WIRE (AS REQUIRED)	14	WATER MAIN
		15	2" x □" BLACK FOAM SLEEVE




- NOTES:
- 1) REFER TO THE TECHNICAL PIPELINE INSTALLATION SPECIFICATIONS
 - 2) NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION
 - 3) LOCATE ENCLOSURE AS SHOWN ON W17
 - 4) INSTALL TRACER WIRE AND WARNING/IDENTIFICATION TAPE ABOVE ALL HORIZONTAL PIPING
 - 5) NOTCH BASE OF GATE WELL TO CENTER OVER VALVE. SET LID FLUSH WITH SLAB.
 - 6) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST



ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	2" PVC SCH 80 CLOSE NIPPLE & 2-SCH 80 STREET ELLS & SUCTION SCREEN	10	2" x 1/2" BLACK FOAM SLEEVE
2	FREEZE PROOF ALL WEATHER ENCLOSURE	11	2" x REQUIRED LENGTH RIGID COPPER PIPE
3	2" MIPT x COMPRESSION ADAPTER	12	2" 90 DEG. BRONZE COMPRESSION ELL
4	2" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE	13	2" COMP BALL VALVE W/ TEE HEAD
5	TRACER WIRE (IF REQUIRED)	14	2" 90 DEG. BRONZE FIPT x COMP ELL
6	1/2" x 3" STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120° APART)	15	2" BRONZE MIPT x MIPT CORPORATION STOP
7	BOX WITH GATE VALVE PER DRAWING W9	16	SIZE x 50mm 2" SERVICE SADDLE
8	1050mm x 750mm x 150mm THICK (42"x 30"x 6" THICK) CONCRETE SLAB	17	WATER MAIN
9	25mm (1") PVC CONDUIT FOR TRACER WIRE INSTALLED 50mm (2") ABOVE SLAB	18	VALVE STEM EXTENSION,(REQ'D)
		19	2" BRONZE COMPRESSION COUPLING (IF REQUIRED)
		20	COLD JOINT STRIP

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: 2" AIR RELEASE VALVE



PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

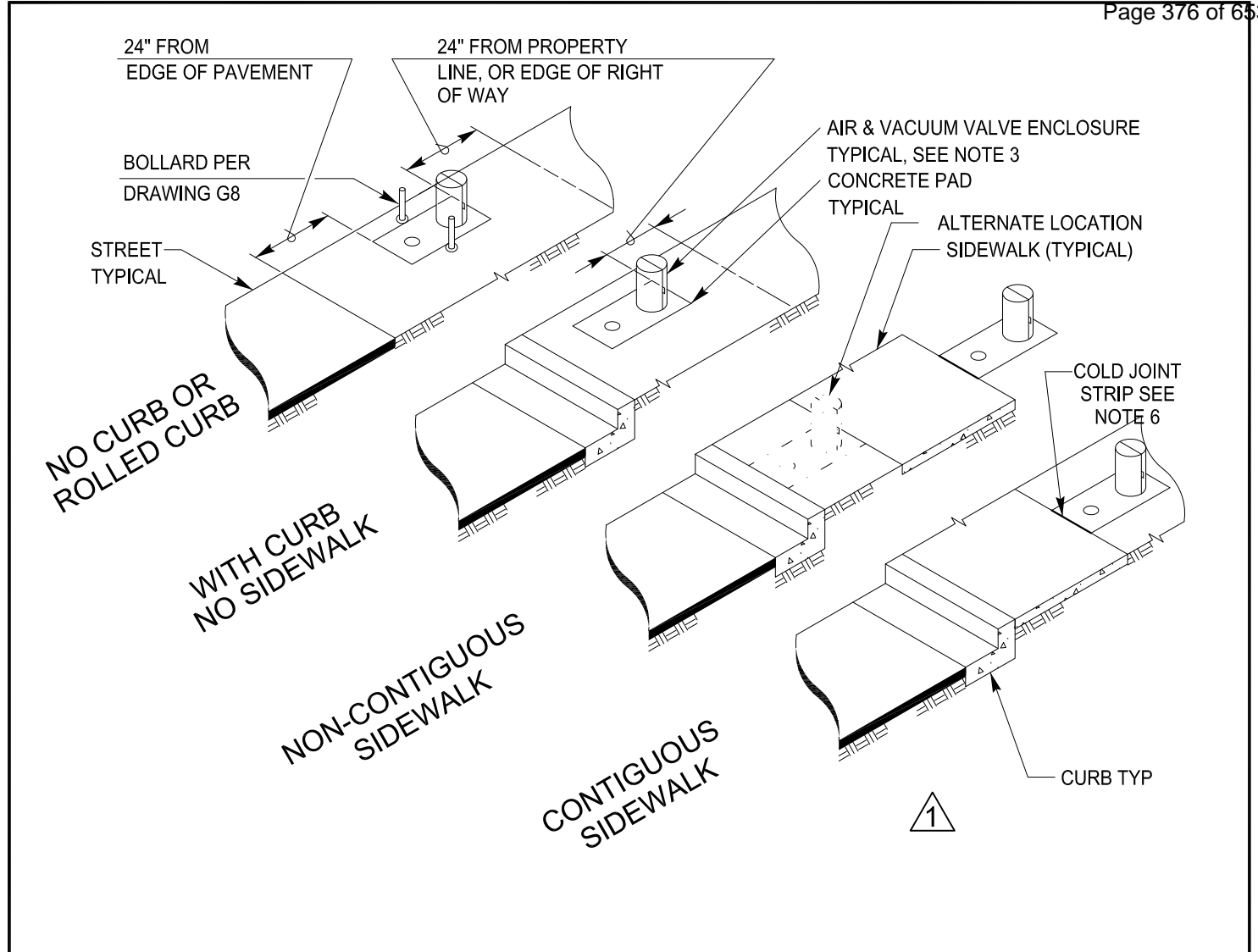
Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	NEW ABOVEGROUND AIR RELEASE DETAIL	SFM	3-16-09	


SCALE: NTS

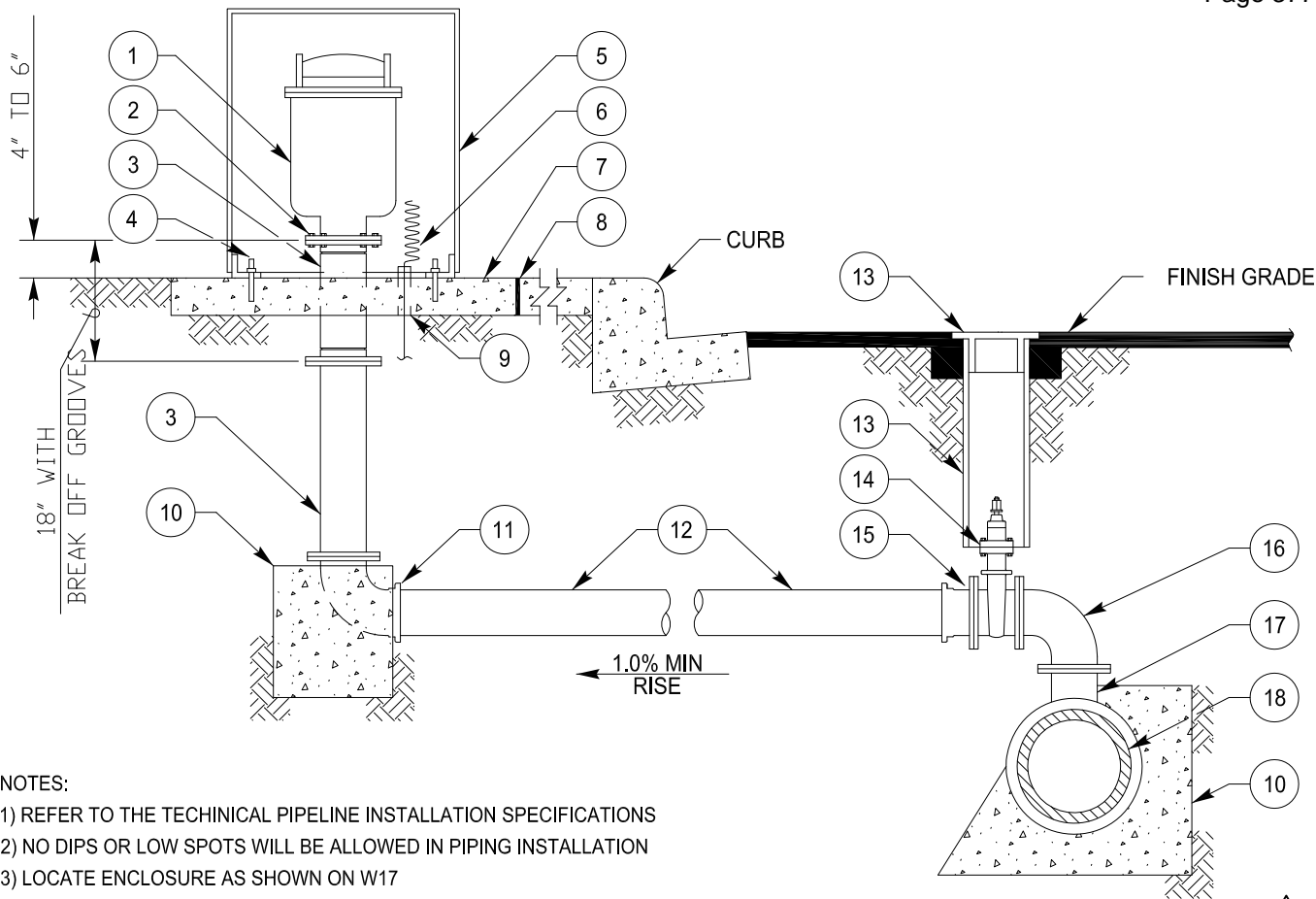
DRAWING NUMBER W16

Thursday, May 27, 2010



- NOTES:
- 1) REFER TO TECHNICAL PIPELINE INSTALLATION SPECIFICATIONS
 - 2) BOLLARDS SHALL BE INSTALLED AS CALLED FOR ON THE PLANS OR AS DIRECTED BY PSUS
 - 3) AN EASEMENT MAY BE NEEDED DEPENDING ON LOCATION OF ENCLOSURE
 - 4) THE ENCLOSURE SHALL BE ARMY BROWN
 - 5) IF THE CONCRETE SLAB IS TO BE INSTALLED ADJACENT TO A CONCRETE SIDEWALK A COLD JOINT STRIP SHALL BE INSTALLED
 - 6) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST

STANDARD CONSTRUCTION DRAWING - FORT JACKSON					TITLE: AIR RELEASE VALVE LOCATIONS				
 <div><div>PALMETTO STATE UTILITY SERVICES, INC.</div><div>A Subsidiary of American States Utility Services, Inc.</div><div>Building 2576, Essayons Way Fort Jackson, SC 29207</div><div>Tel: (803) 790-7288 Fax: (803) 787-2054</div></div>		REVISIONS						SCALE:	
		ZONE	REV.	DESCRIPTION	BY	DATE	APP.	NTS	
				ORIGINAL ISSUE DATE		6-11-08		DRAWING NUMBER	
			1	NEW DETAIL	SFM	3-16-09		W17	
								Thursday, May 27, 2010	



- NOTES:
- 1) REFER TO THE TECHNICAL PIPELINE INSTALLATION SPECIFICATIONS
 - 2) NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION
 - 3) LOCATE ENCLOSURE AS SHOWN ON W17
 - 4) INSTALL WARNING/IDENTIFICATION TAPE ABOVE ALL HORIZONTAL PIPING
 - 5) BREAK-AWAY BOLTS SHALL BE 5/8" x 3" WITH 3/8" HOLE DRILLED IN THE SHAFT OF THE BOLT. INSTALL WITH NUTS ON TOP OF THE FLANGE. BOLT SHAFT SHALL BE FILLED WITH SILICONE SEALANT
 - 6) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	4" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE ASSEMBLY WITH INSECT SCREEN	9	1" PVC CONDUIT FOR TRACER WIRE INSTALLED 2" ABOVE SLAB
2	BREAK-AWAY BOLTS, SEE NOTE 5	10	CONCRETE THRUST/ANCHOR BLOCK PER DWG G9
3	4" FLANGED 8-BOLT DUCTILE IRON PIPE x REQ'D LENGTH (MAX OF 2 SPOOLS)	11	4" FLG x MJ/PO 90 DEG. BEND
4	1/2" x 3" STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120 DEG. APART)	12	4" C-900 PVC PIPE
5	ALL WEATHER ENCLOSURE	13	8" VALVE BOX W/ LID SEE W10
6	TRACER WIRE	14	4" FLG x MJ/PO/FLG RWGV
7	42" X 42" X 6" THICK CONCRETE SLAB	15	4" FLG x MJ/PO ADAPTER (IF REQUIRED)
8	COLD JOINT STRIP	16	4" FLANGE 90° BEND
		17	SIZE x 4" MJ/PO/FLG x FLG TEE
		18	WATER MAIN

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: 4" AUTO AIR RELEASE & AIR/VAC VALVE



PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207

Tel: (803) 790-7288 Fax: (803) 787-2054

ZONE		REV.	DESCRIPTION	BY	DATE	APP.
		1	ORIGINAL ISSUE DATE	SFM	6-11-08	
			NEW DETAIL		3-16-09	

SCALE: NTS

DRAWING NUMBER W18

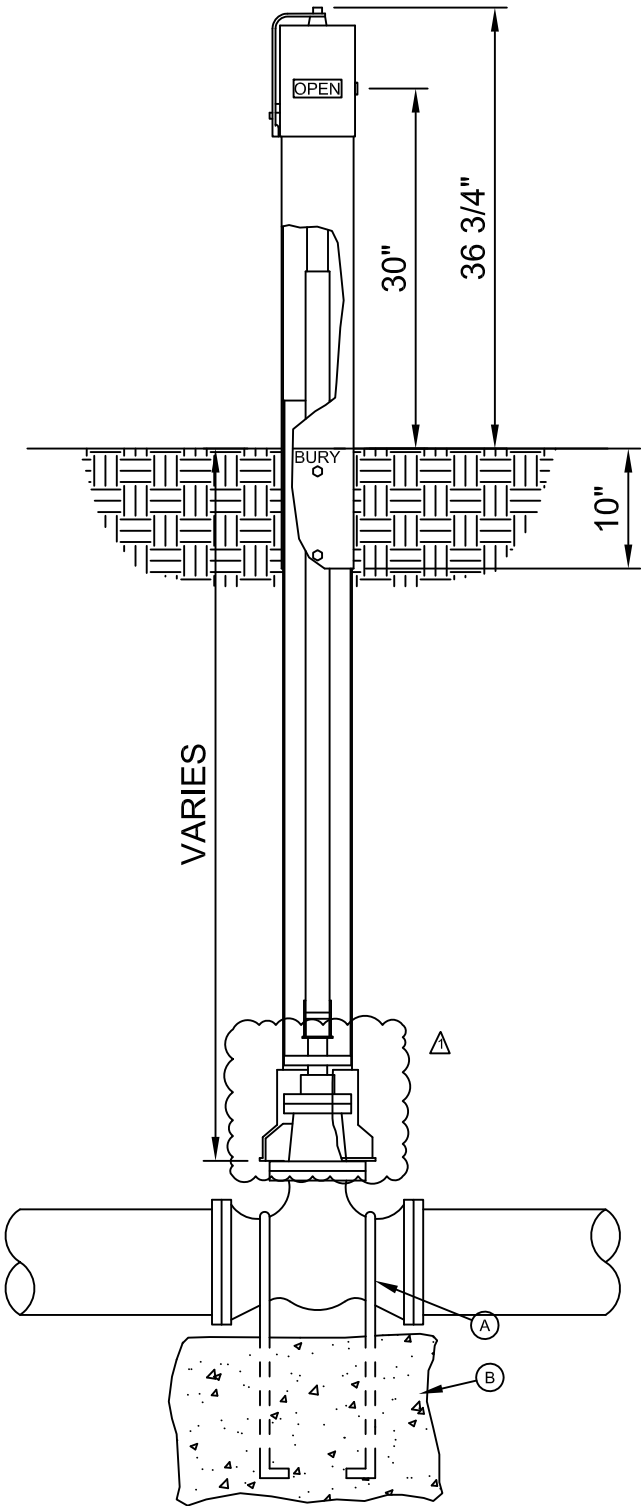
Thursday, May 27, 2010

GENERAL NOTES:

1. THE CONTRACTOR SHALL INSTALL THE POST INDICATING VALVE PER MANUFACTURER'S INSTRUCTIONS.
2. PRODUCT SHALL BE A MUELLER A423 ADJUSTABLE INDICATOR POST OR APPROVED EQUAL.
3. PAINT SAFETY / CHROME YELLOW. SHERWIN WILLIAMS - INDUSTRIAL & MARINE COATINGS, INDUSTRIAL ENAMEL "ALKYD COATING", NUMBER B54 Y 37 / 617-4072, OR APPROVED EQUAL.

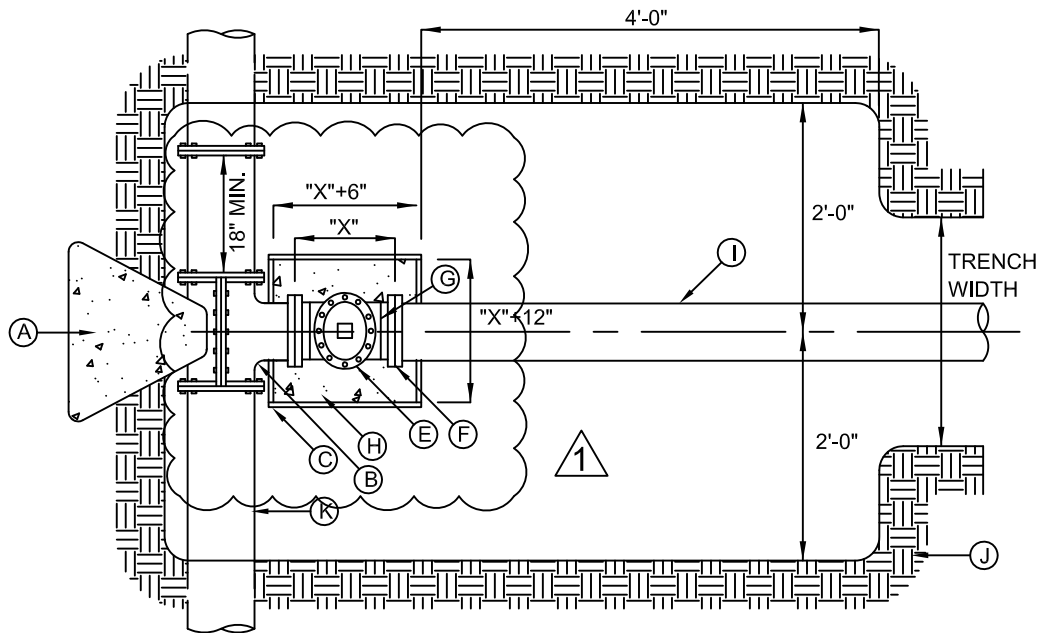
CONSTRUCTION KEY NOTES:

- (A) FOR INSTALLATION OF VALVE ANCHORS, SEE DETAIL W33.
- (B) 3000 PSI CONCRETE VALVE SUPPORT.

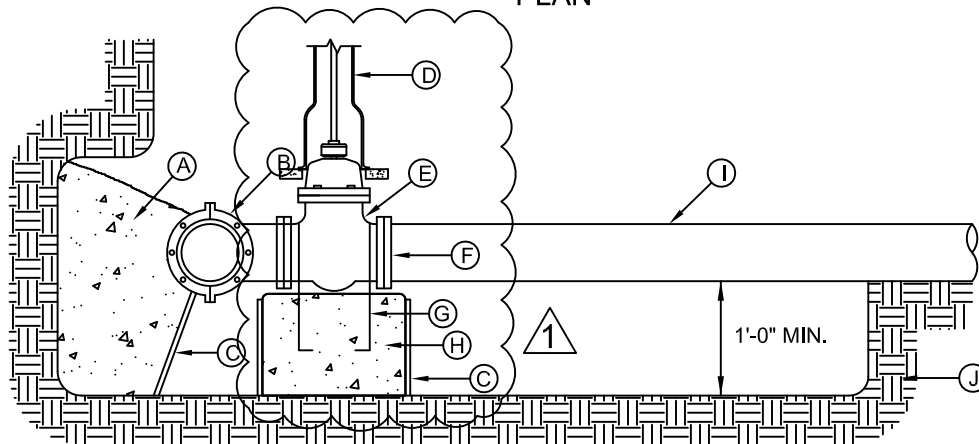


- (A) 2" SERVICE SADDLE
- (B) 2" GATE VALVE W/BOX (SEE DRAWING W13)
- (C) 2" NIPPLE (BRASS)
- (D) 2" COUPLING (BRASS)
- (E) FLANGED SPOOL 2" DIAMETER (BRASS)
- (F) 2" 90° BEND FLANGED (BRASS)
- (G) 2" GATE VALVE FLANGED
- (H) 2" PRESSURE RELIEF VALVE
- (I) 2" COPPER LINE CONNECTED TO A STORM SEWER INLET OR INSTALL A GOOSE NECK ABOVE GRADE WITH INSECT SCREEN.
- (J) INSECT SCREEN
- (K) CONCRETE BOX WITH BILCO HATCH.

Thursday, May 27, 2010



PLAN



SECTION

GENERAL NOTES:

1. THRUST BLOCKING SHALL EXTEND TO UNDISTURBED EARTH.
2. TAPPING SLEEVE SHALL BE 18" MINIMUM FROM ANY BELL, COUPLING, VALVE OR FITTING.
3. JOINTS AND BOLTS SHALL BE CLEAR OF CONCRETE.
4. INSTALL PERMANENT THRUST BLOCKING UNDERVALVE BEFORE TAP IS MADE. JOINTS AND BOLTS TO BE CLEAR OF CONCRETE.
5. VALVE SHALL BE EPOXY COATED AND WRAPPED WITH POLYETHYLENE PLASTIC.
6. SEE W13 FOR VALVE DETAILS.

CONSTRUCTION KEY NOTES:

- (A) CONCRETE THRUST BLOCKING, PER DETAIL G9 & G10.
- (B) TAPPING SLEEVE
- (C) FORMS
- (D) INSTALL VALVE BOX AND COVER PER DETAILS W9 & W10..
- (E) GATE VALVE
- (F) VALVE ENDS FOR TYPE OF PIPE INSTALLED
- (G) 2-#5 REBAR HAIRPINS, PAINT UNEMBEDDED PORTION OF BARS WITH 2-COATS OF COAL TAR EPOXY, THEN COVER WITH 2" MINIMUM OF CEMENT MORTAR.
- (H) CONCRETE VALVE SUPPORT, PER DETAIL W33.
- (I) NEW WATER LINE TO BE CONSTRUCTED.
- (J) UNDISTURBED EARTH
- (K) EXISTING WATER MAIN TO BE TAPPED

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

TAPPING SADDLE AND VALVE

PALMETTO STATE UTILITY
SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207

Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	MOVED VALVE; ADDED NOTES	SFM	3-16-09	

SCALE:

NTS

DRAWING NUMBER

W21

May-27

Thursday, May 27, 2010

GENERAL NOTES:

1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
3. PRODUCT SHALL BE U.S. FOUNDRY & MFG. CORP. ORDERED AS FOLLOWS:

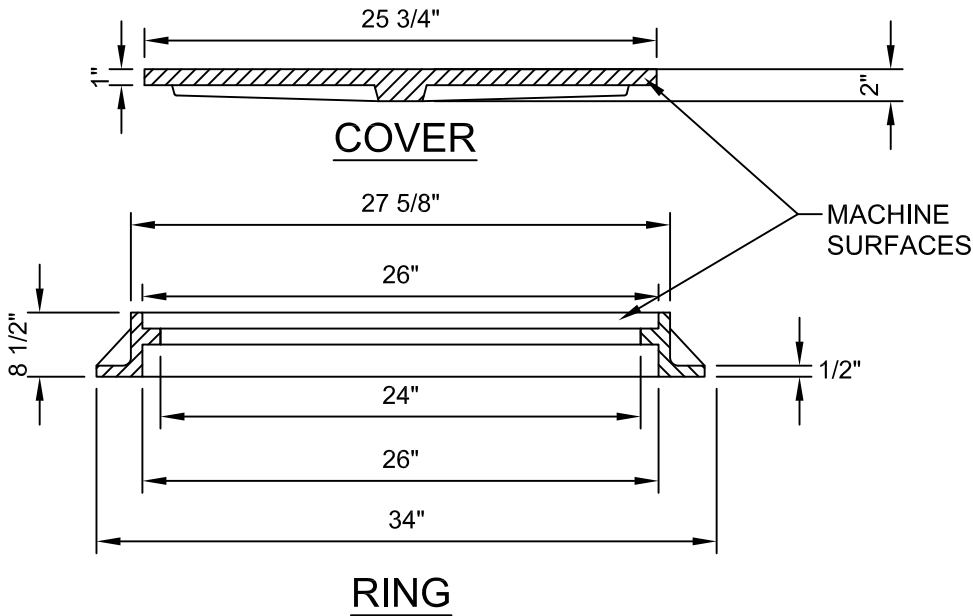
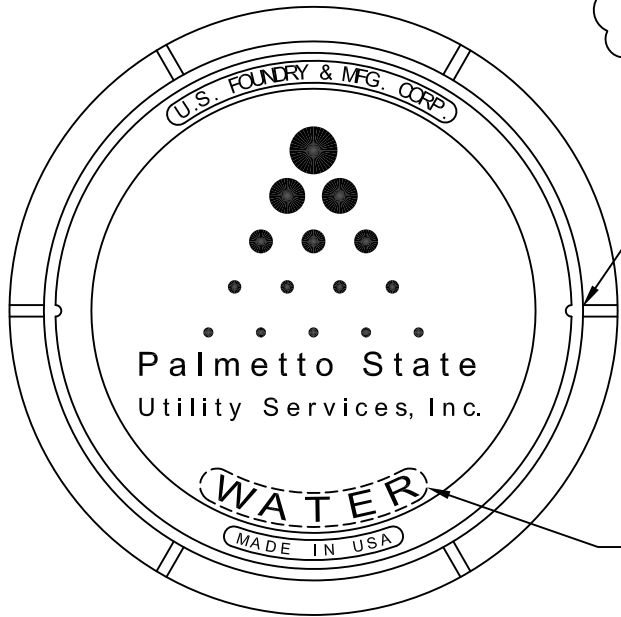
MATERIAL:ASTM - A48

GRAY IRON CLASS: 35B

RING WEIGHT: 260 LBS.

COVER WEIGHT: 140 LBS

ITEM NO.: 152 OV



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: 24" MANHOLE RING AND COVER



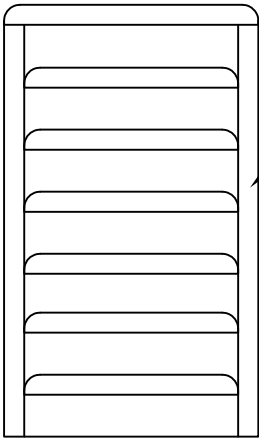
PALMETTO STATE UTILITY SERVICES, INC.
A Subsidiary of American States Utility Services, Inc.
Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

ZONE		REV.	DESCRIPTION	BY	DATE	APP.
			ORIGINAL ISSUE DATE		6-11-08	
		1	ADD RING & COVER ORDER INFORMATION	SFM	3-16-09	

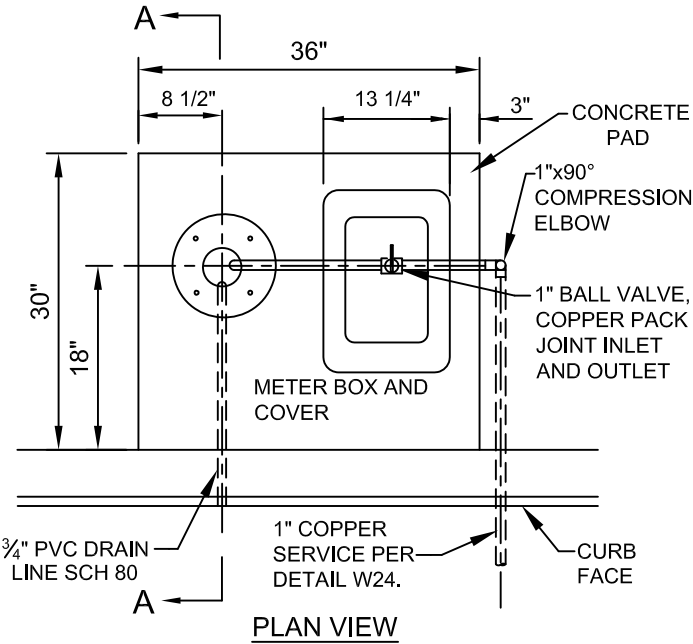
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DRAWING NUMBER W/22
Thursday, May 27, 2010

GENERAL NOTES:

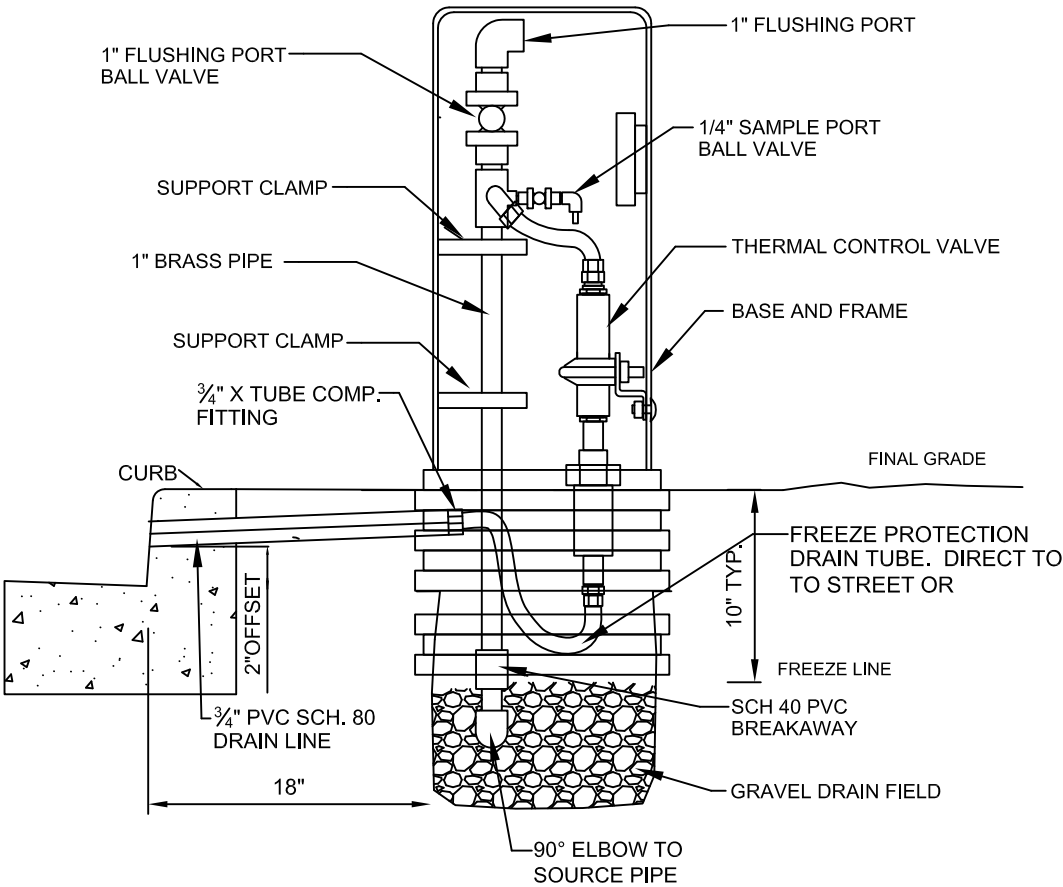
1. SAMPLING STATION SHALL BE SAFETY GUARD MODEL SG-BSS-03 OR APPROVED EQUAL.
2. IF EXISTING CURB IS CRACKED OR HAS AN EXPANSION JOINT WITHIN 3 FEET OF THE PROPOSED SAWCUT, EXTEND LIMITS OF CUT TO THAT POINT.
3. NO SAMPLERS SHALL BE INSTALLED BEYOND LIMITS OF PUBLIC RIGHT OF WAY WITHOUT EASEMENTS.
4. DOOR SHALL OPEN TO SIDE OPPOSITE VEHICULAR TRAFFIC.



COVER w/LOCK



PLAN VIEW



SECTION A-A

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

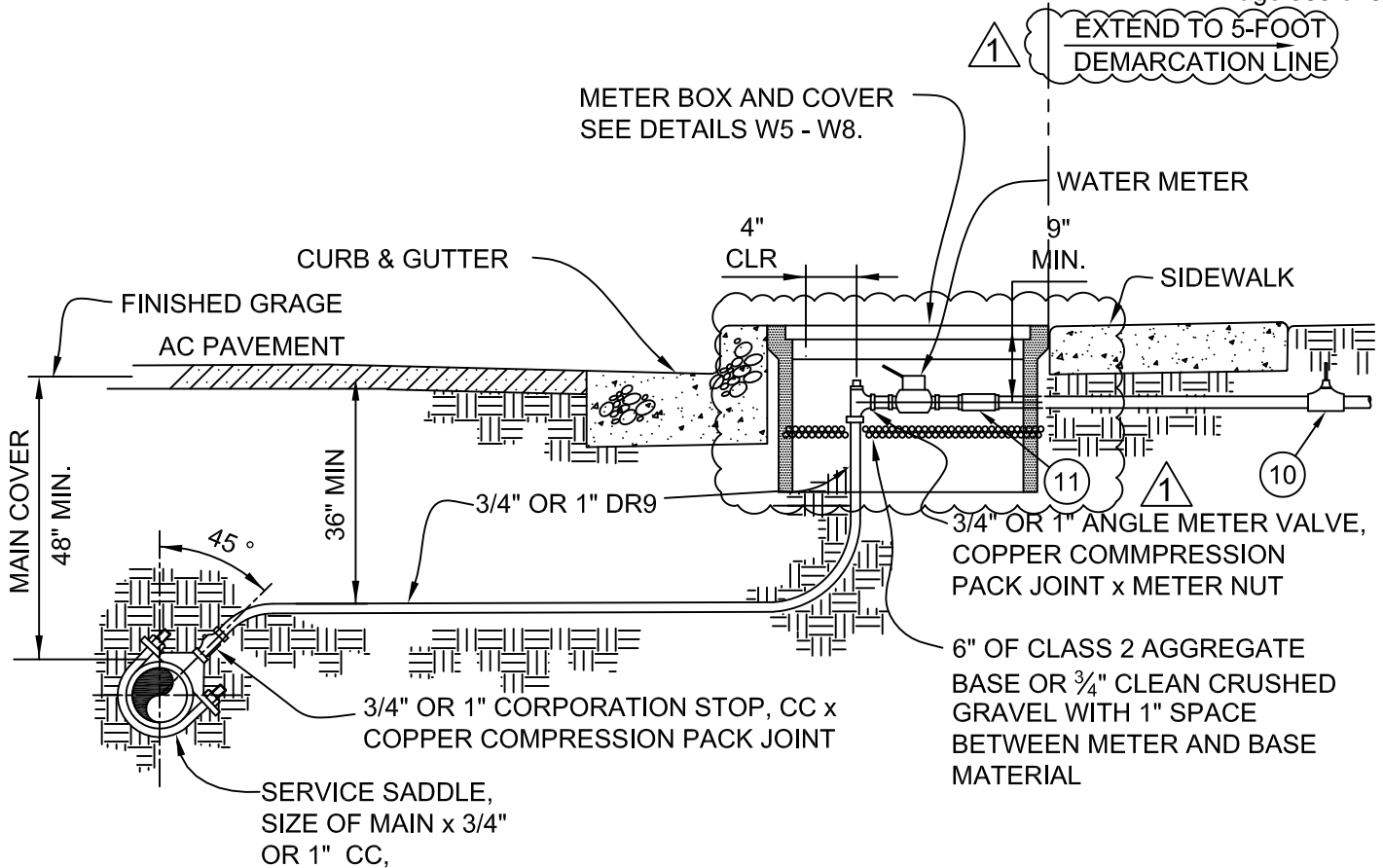
SAMPLING STATION



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ZONE		REV.		REVISIONS			SCALE:		
				DESCRIPTION			NTS		
				ORIGINAL ISSUE DATE			DRAWING NUMBER		
		1		NEW SHEET			W/23		
							Thursday, May 27, 2010		

SCALE:
NTS
DRAWING NUMBER

**GENERAL NOTES:**

1. WHEN SIDEWALK & CURB ABUT, PLACE THE METER BEYOND SIDEWALK.
2. 12" MINIMUM SPACING BETWEEN SERVICE TAPS.
3. SNAKE THE SERVICE LINE IN TRENCH TO PROVIDE ENOUGH SLACK TO ALLOW AT LEAST ONE FOOT OF THERMAL CONTRACTION PER 100 FEET OF LENGTH.
4. NO JOINTS PERMITTED IN SERVICE LINES.
5. NEW D.I.P. MAY BE DIRECT TAPPED
6. FOR 5/8"x3/4" METER, USE AN A24 ADAPTER.
7. FOR 3/4"x3/4" METER, USE AN A34 ADAPTER.
8. 1" ANGLE METER VALVE, 1" COPPER PACK JOINT x 3/4" METER NUT MAY BE UTILIZED WHEN SPECIFIED ON CONSTRUCTION PLANS.
9. SERVICES SHALL BE INSTALLED A MINIMUM OF 10 FEET FROM ALL SEWER LATERALS.
10. PRESSURE REGULATOR SOMETIMES LOCATED NEAR THE RESIDENCE.
11. A DUAL CHECK BACKFLOW PREVENTER SHALL BE INSTALLED ON THE OUTLET SIDE OF THE WATER.
12. ALL SERVICE ASSEMBLIES TO BE INSTALLED AT BUILDING EXTERIOR OUTSIDE THE 5-FOOT DEMARCATION LINE OF STRUCTURES.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

3/4" OR 1" SERVICE

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REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	UPDATE METER BOX, DEMARCATION NOTES	SFM	3-16-09	

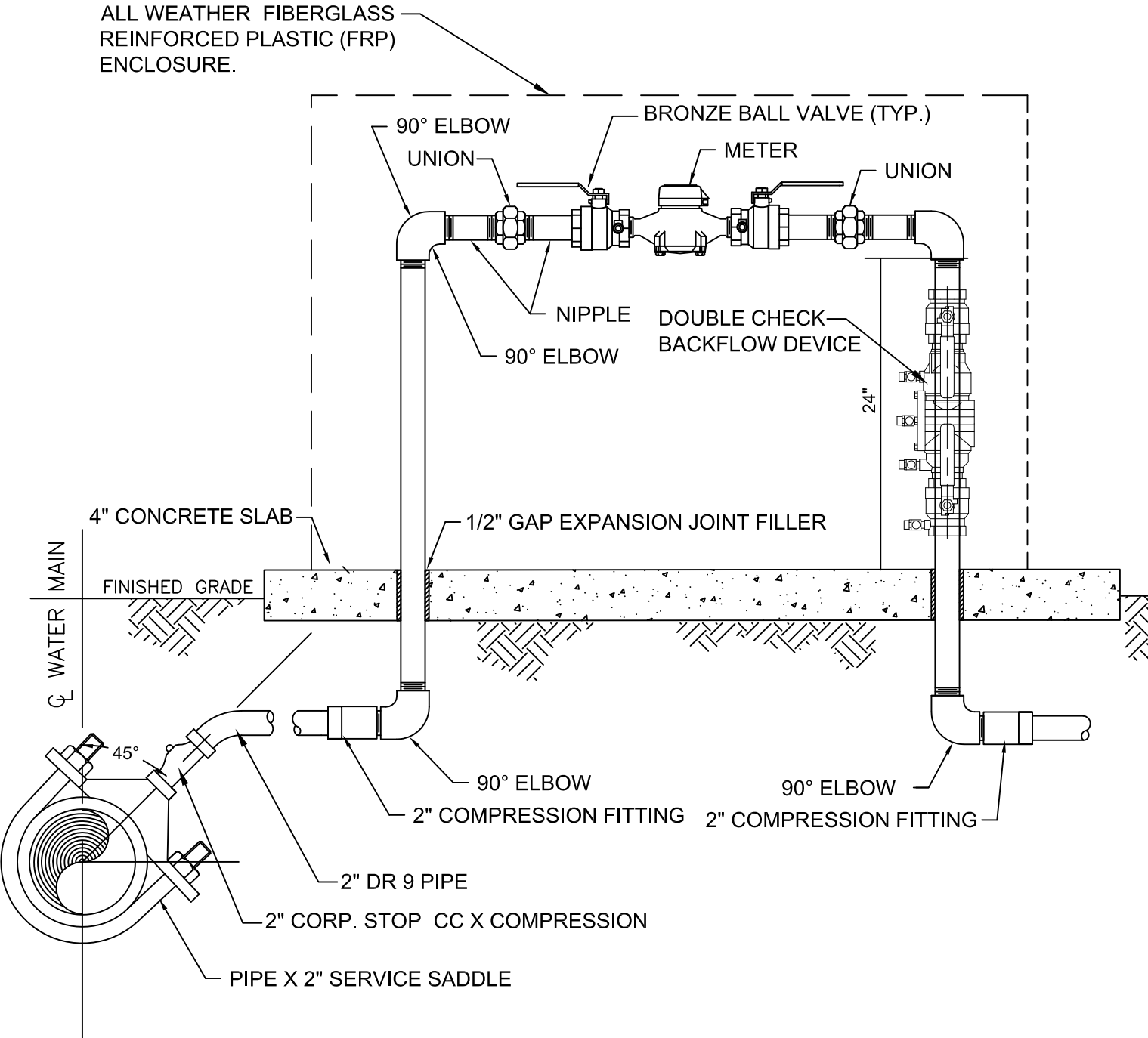
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NTS

DRAWING NUMBER

W/24

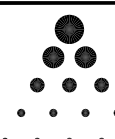
Thursday, May 27, 2010



GENERAL NOTES:

1

- 1. VERTICAL AND ABOVE-GRADE PIPING SHALL BE BRASS.
- 2. SEE DRAWING W30 FOR ENCLOSURE DETAILS.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON					TITLE: 2" SERVICE				
 <div>PALMETTO STATE UTILITY SERVICES, INC. A Subsidiary of American States Utility Services, Inc. Building 2576, Essayons Way Fort Jackson, SC 29207 Tel: (803) 790-7288 Fax: (803) 787-2054</div>			REVISIONS						SCALE: NTS Thursday, May 27, 2010 W25
			ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
					ORIGINAL ISSUE DATE		6-11-08		
				1	NEW ABOVEGROUND DETAIL	SFM	3-16-09		

PRINCIPLE AND DOUBLE CHECK VALVES ASSEMBLIES

1. THE BACKFLOW PREVENTER SHALL BE INSTALLED 5' FROM THE WATER METER. THE BACKFLOW PREVENTER SHALL NOT BE INSTALLED CLOSER THAN 5' FROM ANY BUILDING FOUNDATION.
2. REDUCED PRESSURE PRINCIPLE ASSEMBLIES MUST BE INSTALLED IN A HORIZONTAL POSITION AND IN A LOCATION IN WHICH NO PORTION OF THE ASSEMBLY CAN BECOME SUBMERGED UNDER ANY CIRCUMSTANCES.
3. DOUBLE CHECK VALVE ASSEMBLIES MAY BE INSTALLED IN A VERTICAL POSITION, PROVIDED THE FLOW OF WATER IS IN AN UPWARD POSITION.
4. REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTERS AND DOUBLE CHECK VALVE ASSEMBLIES MUST BE INSTALLED ABOVE GROUND.
5. BACKFLOW PREVENTION ASSEMBLIES OUTSIDE AND ABOVE GROUND MUST BE PROTECTED FROM FREEZING. THE BACKFLOW PREVENTION ASSEMBLY MUST BE INSTALLED BETWEEN MINIMUM AND MAXIMUM DISTANCES ABOVE GROUND OF 12 INCHES AND 48 INCHES RESPECTIVELY. LANDSCAPING IS ALLOWED AROUND THE BACKFLOW PREVENTER, BUT MUST NOT INTERFERE WITH THE REQUIRED ANNUAL TESTING, AND/OR REPAIR OF THE BACKFLOW PREVENTION ASSEMBLY. ROOT STRUCTURES OF PLANTINGS MUST BE GREATER THAN 18" BELOW THE SURFACE.
6. BACKFLOW PREVENTION ASSEMBLIES 2" AND LARGER MUST BE SUPPORTED TO ALLOW FOR THE WEIGHT OF THE BACKFLOW PREVENTION ASSEMBLY. SUPPORT AND FOOTING CONSTRUCTION MUST BE OF TYPE AND MATERIAL SUFFICIENT TO SUPPORT THE ASSEMBLY. SUPPORTS MUST HAVE A PROPER FOOTING (4 INCHES OF CONCRETE) FOR SUPPORTS TO REST UPON. BACKFLOW PREVENTION ASSEMBLY SUPPORTS MUST NOT INTERFERE WITH THE OPERATION OF VALVES, TEST COCKS, TESTING, AND/OR REPAIR OF THE BACKFLOW PREVENTION ASSEMBLY.
7. ALL PIPING LARGER THAN 3" IN DIAMETER MUST BE OF DUCTILE IRON, OR STEEL. 2" DIAMETER PIPING MUST BE BRASS.
8. BEFORE STARTING INSTALLATION OF A BACKFLOW PREVENTER, CONTACT PALMETTO STATE UTILITY SERVICES TO ENSURE THE PROPER INSTALLATION OF THE BACKFLOW PREVENTION ASSEMBLY AND ENSURE THAT THE BACKFLOW PREVENTER MEETS THE CURRENT PSUS APPROVAL LIST, AS SPECIFIED.
9. ALL ASSEMBLIES FOR USE IN THE PSUS SYSTEM SHALL MEET MANUFACTURER QUALITY ASSURANCES, AS STATED IN THE SPECIFICATIONS.
10. BACKFLOW PREVENTION ASSEMBLIES 2" AND SMALLER SHALL HAVE 1/4 TURN, FULL PORT, RESILIENT SEATED, BRONZE BALL VALVE SHUT-OFF.
11. ASSEMBLIES TWO AND ONE HALF INCH, 3", AND LARGER SHALL HAVE RESILIENT WEDGE SHUT-OFF VALVES; THE BACKFLOW PREVENTER AND RESILIENT WEDGE SHUT-OFF VALVES MUST BE FUSE BONDED EPOXY COATED.
12. INSULATION SHALL BE FURNISHED AND DESIGNED BY THE MANUFACTURER OF THE ENCLOSURE, TO MAINTAIN AN INTERIOR TEMPERATURE OF +40° F WITH AN EXTERIOR /OUTSIDE TEMPERATURE OF -30°F AND A WIND VELOCITY OF 15 MPH.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: CROSS CONNECTION CONTROL NOTES



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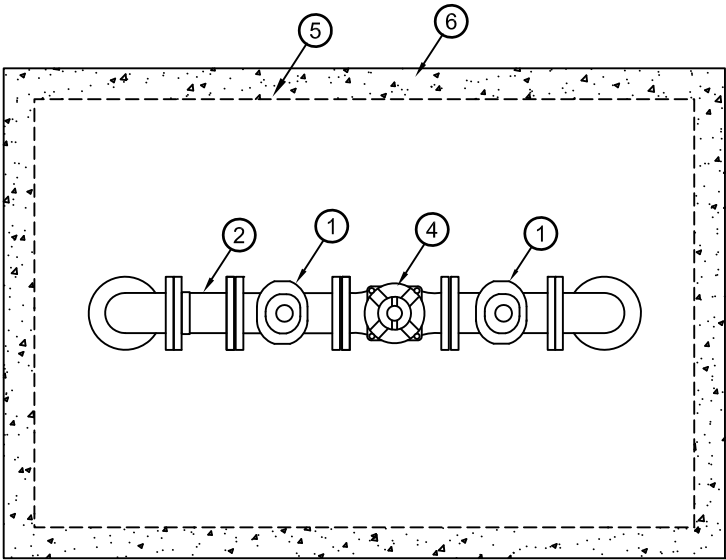
REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	NO CHANGES	SFM	3-16-09	

SCALE:

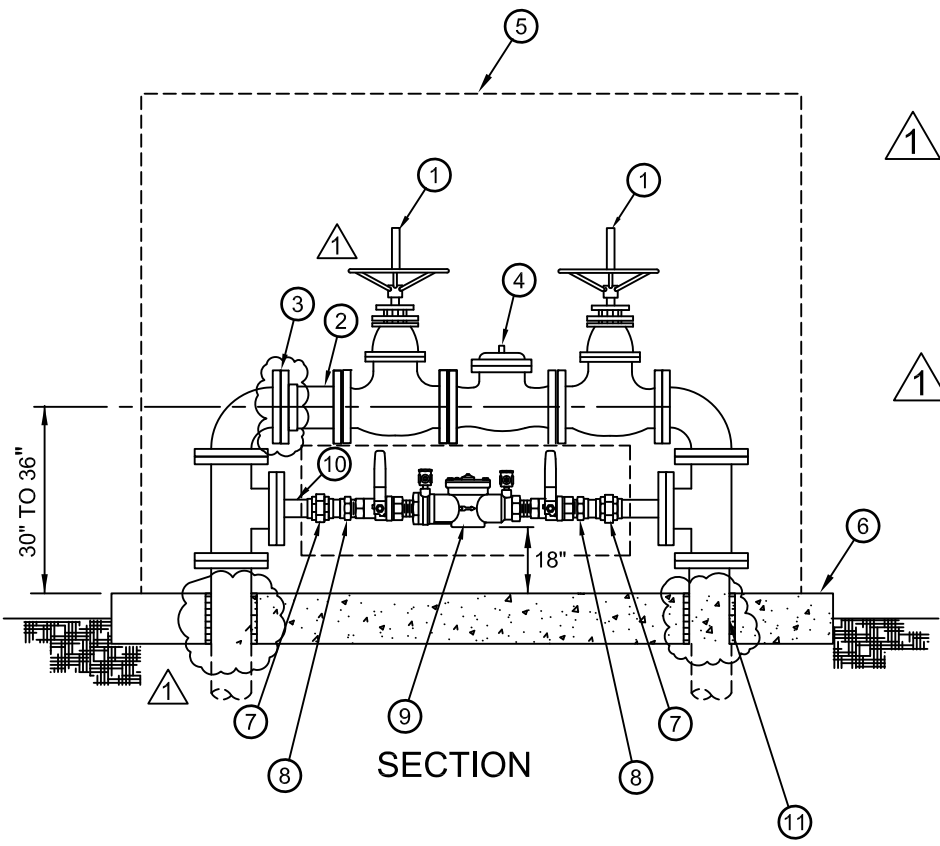
NTS

Thursday, May 27, 2010

W26



PLAN



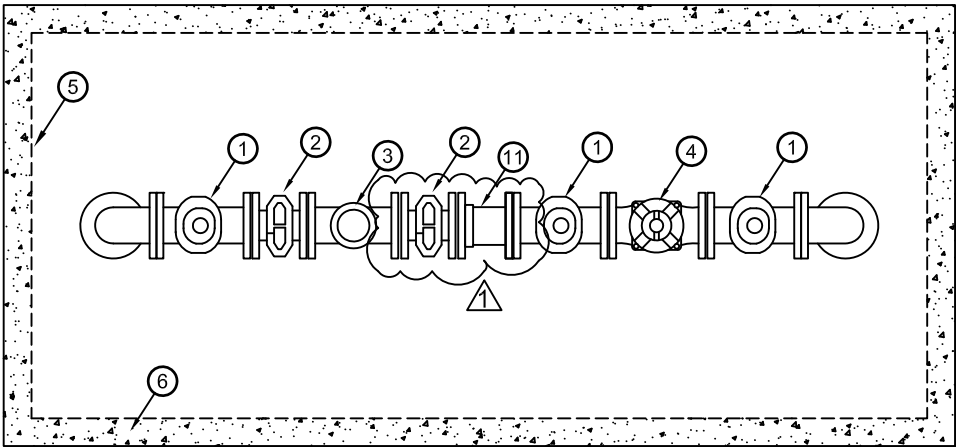
SECTION

GENERAL NOTE:

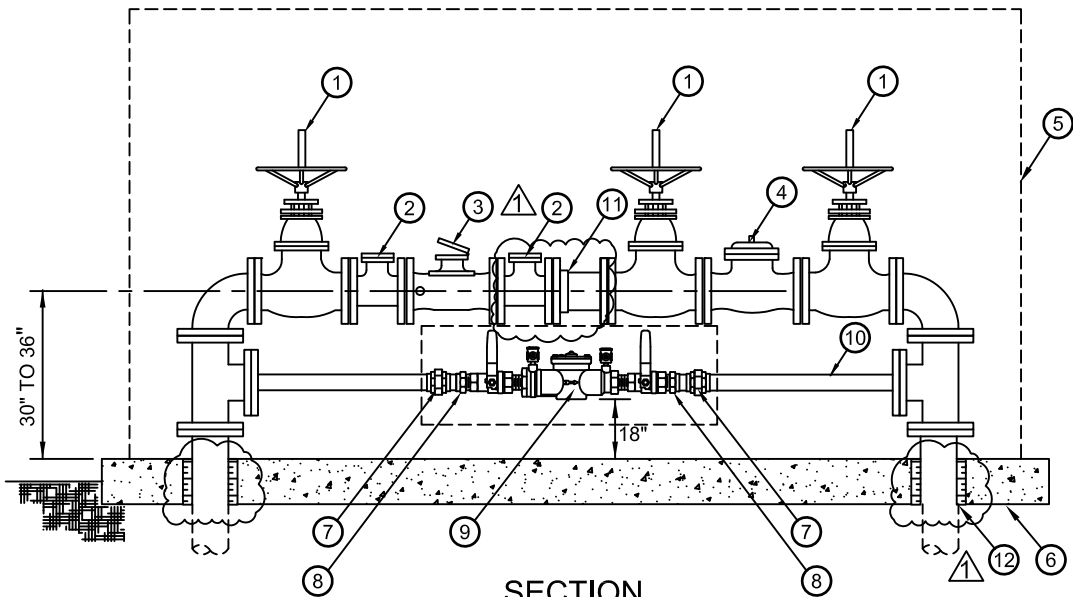
1. PIPING FITTINGS AND VALVES SHALL BE THE SAME SIZE AS THE (BFP) BACKFLOW PREVENTOR WITH THE EXCEPTION OF THE 3". THE 3" (BFP) SHALL HAVE 4" PIPING AND FITTINGS WITH REDUCERS TO CONNECT 3" (BFP).
2. PAINT ENCLOSURE SEMI-GLOSS FINISH. COLOR: ARMY BROWN, SPRAY-ON SEMI GLOSS (MINIMAL SHEEN FINISH), COMMERCIAL GRADE OUTDOOR AMERON-EPOXY OR ALKYD MATERIAL WITH BASE AND TOP COAT AS MAY BE REQUIRED TO PREVENT CHALKING, OR APPROVED EQUAL. FACTORY PAINT WITHIN 7 DAYS OF MANUFACTURE.
3. BACKFLOW PREVENTER SHALL BE AMES (WATTS) SERIES 2000SS (SERIES 774) OR EQUAL
4. ALL SERVICE ASSEMBLIES TO BE INSTALLED AT BUILDING EXTERIOR OUTSIDE 5-FOOT DEMARCATION LINE OF STRUCTURES.
5. ALL ABOVE GROUND PIPING SHALL BE METAL

KEY NOTES:

- 1 GATE VALVE
- 2 SPOOL PIECE FLG X PE
- 3 FLANGE ADAPTER
- 4 DOUBLE CHECK ASSEMBLY
- 5 FRP ALL WEATHER ENCLOSURE TO BE FACTORY PAINTED ARMY BROWN. SIZE AS REQUIRED. SEE DETAILS W30 AND W31.
- 6 CONCRETE SLAB AS SPECIFIED BY ENCLOSURE MANUFACTURER.
- 7 2" BRASS UNION
- 8 2" BRASS MALE ADAPTER
- 9 2" BACKFLOW PREVENTER
- 10 2" BRASS PIPE, TYPE K.
- 11 1/2" GAP WITH EXPANSION JOINT FILLER (TYP)



PLAN



SECTION


KEY NOTES:

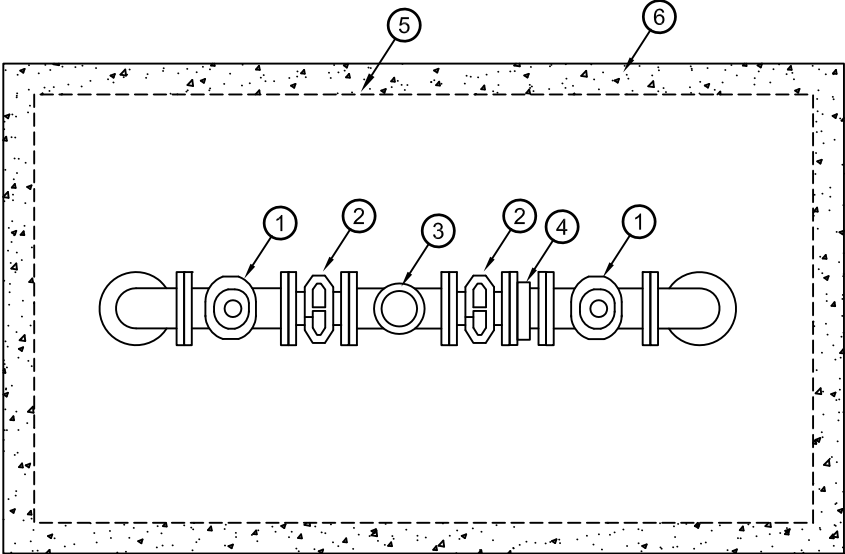
- GATE VALVE
- STRAINER
- AWWA CLASS II METER W/MEGA LUGS. MANUFACTURER: MASTER METER TYPE:
 - DUAL BODY COMPOUND METER FOR SIZES 2", 3", 4", 6"
 - MMT TURBINE METER FOR SIZES 8", 10"
- DOUBLE CHECK ASSEMBLY
- FRP ALL WEATHER ENCLOSURE TO BE FACTORY PAINTED ARMY BROWN. SIZE AS REQUIRED. SEE DETAILS W30 AND W31.
- CONCRETE SLAB AS SPECIFIED BY SAFE-T COVER MANUFACTURER.
- 2" BRASS UNION
- 2" BRASS MALE ADAPTER
- 2" BACKFLOW PREVENTER
- 2" BRASS PIPE, TYPE K.
- SPOOL PIECE FLG X PE
- 1/2" GAP WITH EXPANSION JOINT FILLER

GENERAL NOTES:

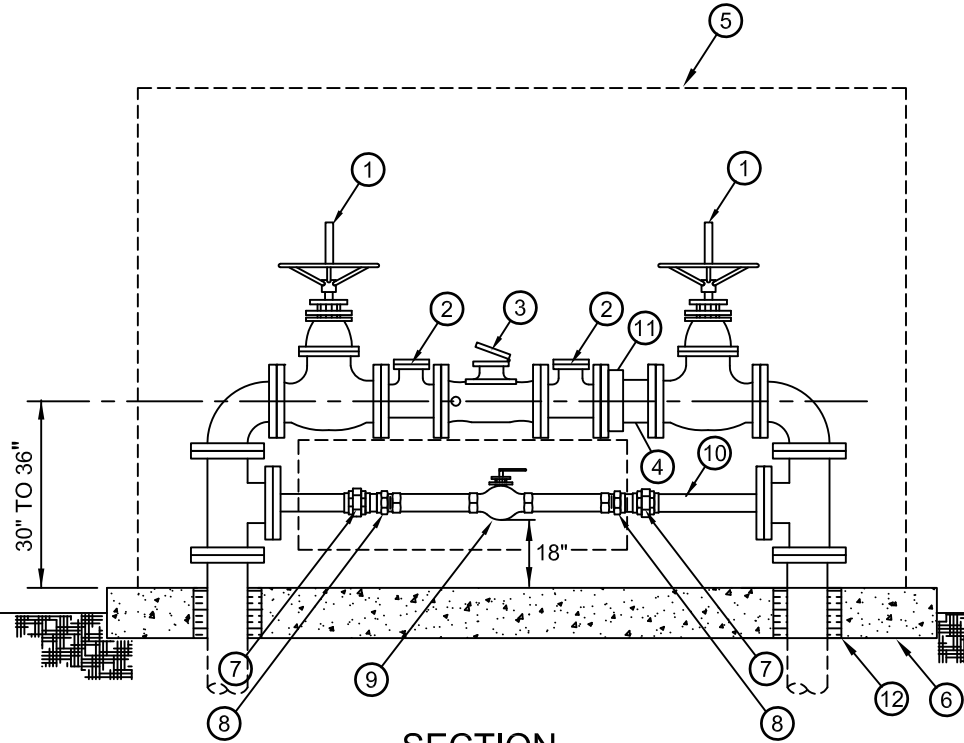
- PIPING FITTINGS AND VALVES SHALL BE THE SAME SIZE AS THE (BFP) BACKFLOW PREVENTOR WITH THE EXCEPTION OF THE 3". THE 3" (BFP) SHALL HAVE 4" PIPING AND FITTINGS WITH REDUCERS TO CONNECT 3" (BFP).
- PAINT ENCLOSURE SEMI-GLOSS FINISH. COLOR: ARMY BROWN, SPRAY-ON SEMI GLOSS (MINIMAL SHEEN FINISH), COMMERCIAL GRADE OUTDOOR AMERON-EPOXY OR ALKYD MATERIAL WITH BASE AND TOP COAT AS MAY BE REQUIRED TO PREVENT CHALKING, OR APPROVED EQUAL, FACTORY PAINT WITHIN 7 DAYS OF MANUFACTURE.
- BACKFLOW PREVENTER SHALL BE AMES (WATTS) SERIES 2000SS (SERIES 774) OR EQUAL
-
- ALL SERVICE ASSEMBLIES TO BE INSTALLED AT BOULING EXTERIOR OURSIDE 5-FOOT DEMARCATION LINE OF STRUCTURES.
- ALL ABOVE GROUND PIPING SHALL BE METAL.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON TITLE: 3"-10" BACKFLOW PREVENTER W/ METER

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	ZONE	REV.	DESCRIPTION	BY	DATE	APP.	
			ORIGINAL ISSUE DATE		6-11-08		
		1	REV. GAP, METER, ENCL., ADD STRAINER & SPOOL	SFM	3-16-09		



PLAN



SECTION

- GENERAL NOTE
1.

PIPING FITTINGS AND VALVES SHALL BE THE SAME SIZE AS THE METER.
2.

PAINT IN SEMI-GLOSS FINISH. COLOR: ARMY BROWN, SPRAY-ON SEMI GLOSS (MINIMAL SHEEN FINISH), COMMERCIAL GRADE OUTDOOR AMERON-EPOXY OR ALKYD MATERIAL WITH BASE AND TOP COAT AS MAY BE REQUIRED TO PREVENT CHALKING, OR APPROVED EQUAL. FACTORY PAINT WITHIN 7 DAYS OF MANUFACTURING.
3.

AWWA CLASS II METER
MANUFACTURER: MASTER METER
TYPE:
 - DUAL BODY COMBINATION METER FOR SIZES 2", 3", 4", 6"
 - MMT TURBINE METER FOR SIZES 8", 10"
4.

ALL SERVICE ASSEMBLIES TO BE INSTALLED AT BUILDING EXTERIOR OUTSIDE 5-FOOT DEMARCATION LINE OF STRUCTURES.
5.

ALL ABOVE GROUND PIPING SHALL BE METAL.

KEY NOTES:

- 1

GATE VALVE
- 2

STRAINER
- 3

AWWA CLASS II METER
- 4

SPOOL PIECE (LENGTH AS REQUIRED)
- 5

FRP ALL WEATHER ENCLOSURE TO BE FACTORY PAINTED ARMY BROWN. SIZE AS REQUIRED. SEE DETAILS W30 AND W31.
- 6

CONCRETE SLAB AS SPECIFIED BY ENCLOSURE MANUFACTURER.
- 7

2" BRASS UNION
- 8

2" BRASS MALE ADAPTER
- 9

2" BALL VALVE
- 10

2" BRASS PIPE, TYPE K.
- 11

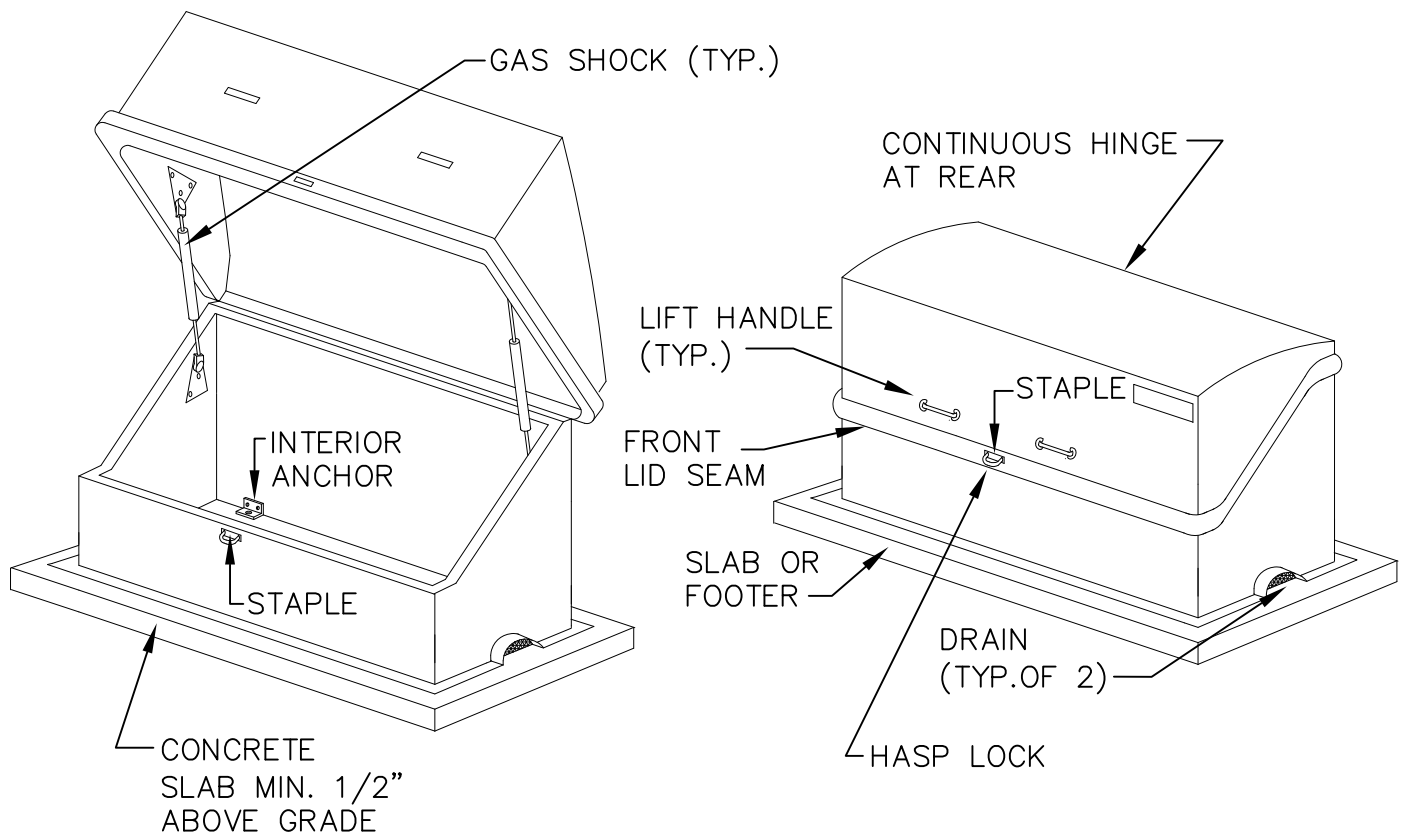
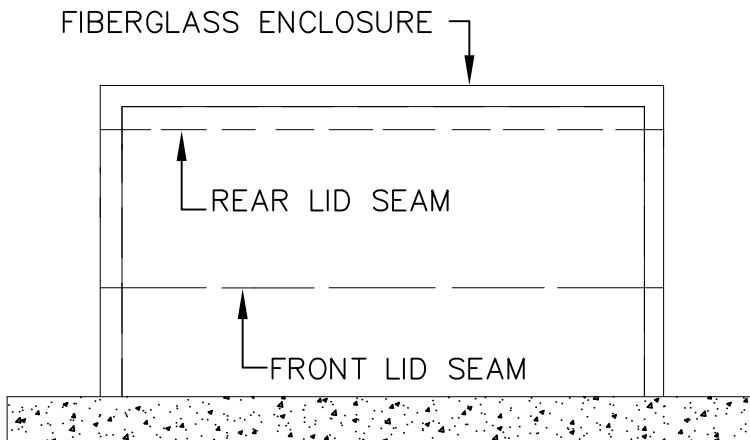
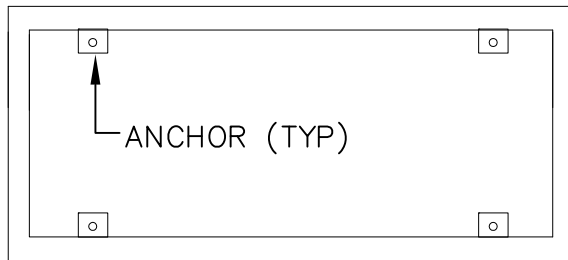
FLANGE COUPLING ADAPTER
- 12

1/2" GAP WITH EXPANSION JOINT FILLER

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	1	NEW SHEET	SFM	3-16-09	

NOTES

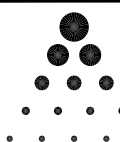
1. ALL DIMENSIONS ARE APPROXIMATED IN INCHES.
2. PROVIDE SLAB PER MANUFACTURERS RECCOMENDATIONS.
3. THE ENCLOSURE SHALL BE INSULATED TO PREVENT FREEZING OF COMPONENTS. MANUFACTURER SHALL SUPPLY INSULATION TECHNICAL DATA SHOWING R-VALUE AND EXPOSURE RATING.
4. COLOR SHALL BE ARMY BROWN.



STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

ALL WEATHER ENCLOSURE



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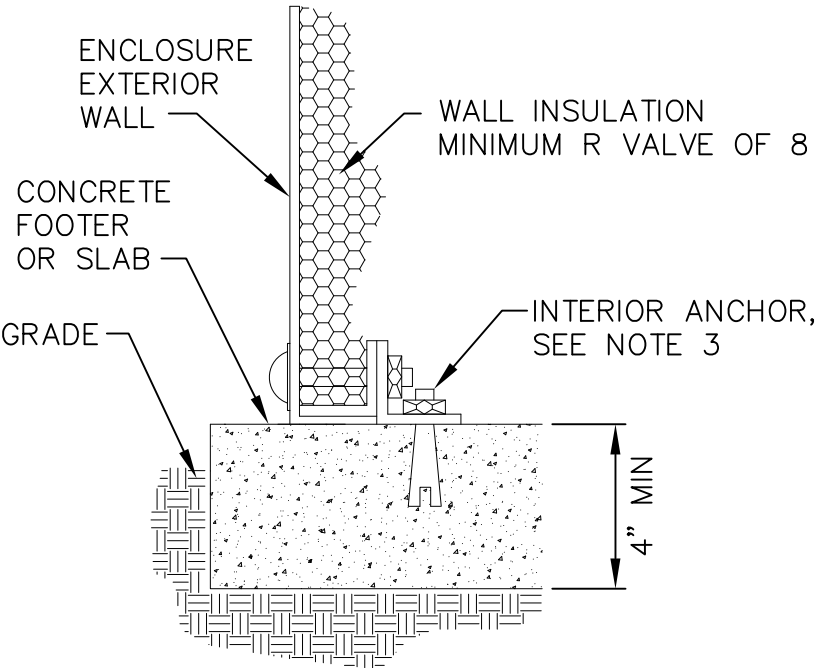
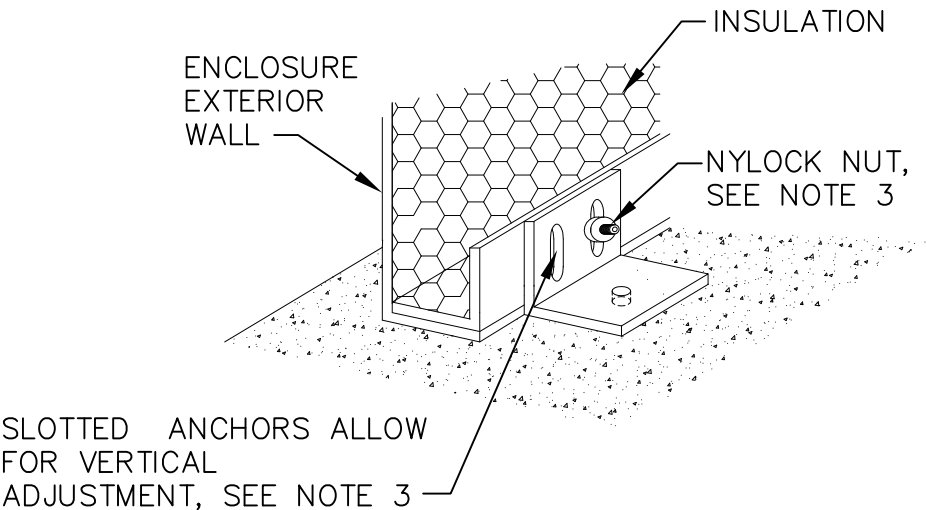
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ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	1	NEW SHEET	SFM	3-16-09	

SCALE:


NTS

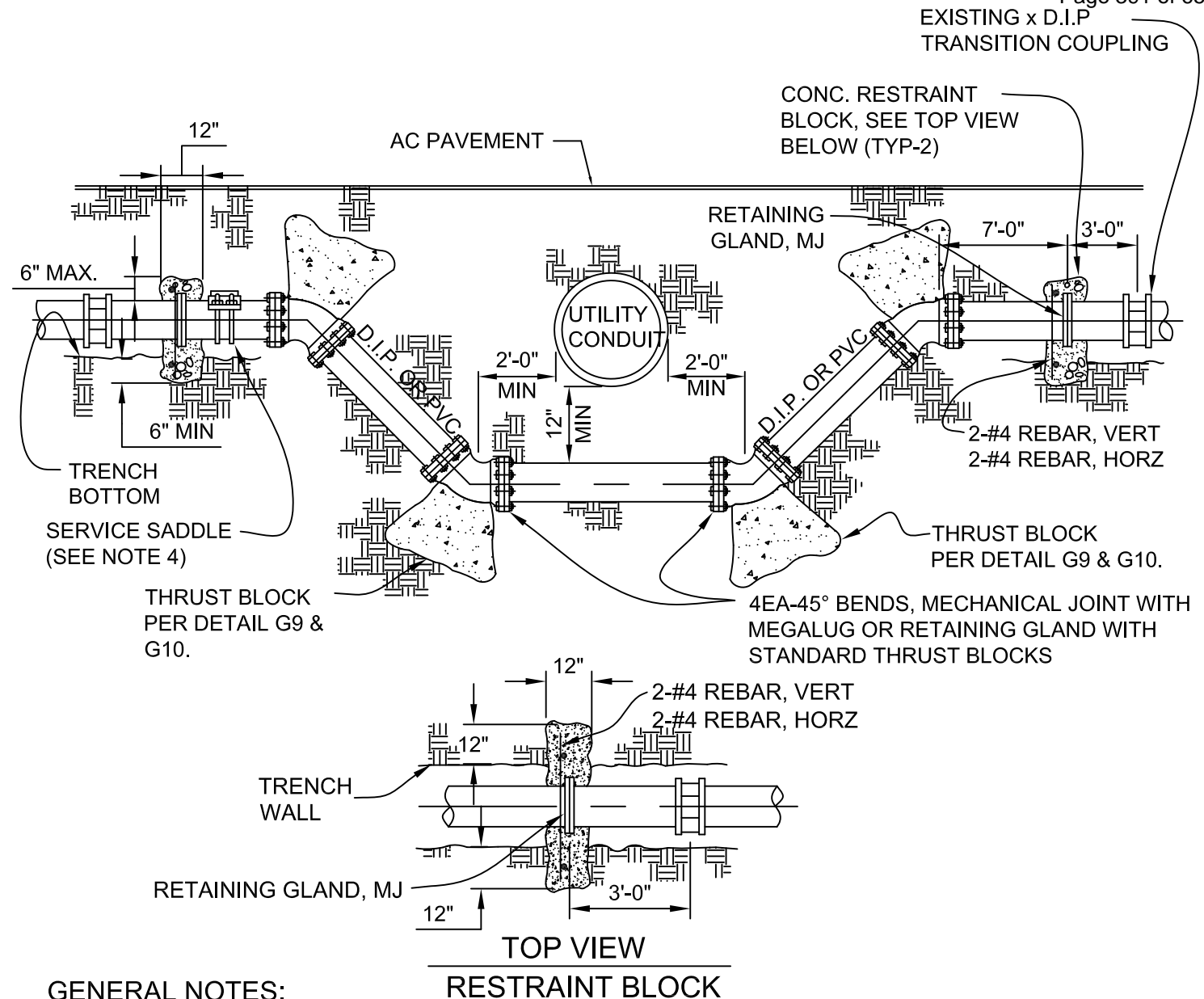
Thursday, May 27, 2010

W30



- NOTES
- 1. ALL DIMENSIONS ARE APPROXIMATED IN INCHES.
 - 2. RECOMMENDED SLAB SIZE TO MEET OR EXCEED MANUFACTURER’S RECOMMENDATIONS.
 - 3. ANCHORS TO BE MADE OF NONFERROUS MATERIALS PER MANUFACTURER’S RECOMMENDATIONS.
 - 4. SEE CROSS CONNECTION CONTROL NOTES FOR ADDITIONAL REQUIREMENTS.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON					TITLE: ENCLOSURE ANCHOR							
<div><p>PALMETTO STATE UTILITY SERVICES, INC. A Subsidiary of American States Utility Services, Inc. Building 2576, Essayons Way Fort Jackson, SC 29207 Tel: (803) 790-7288 Fax: (803) 787-2054</p></div>					REVISIONS					SCALE:		
					ZONE	REV.	DESCRIPTION	BY	DATE	APP.	NTS	
						1	NEW SHEET	SFM	3-16-09		Thursday, May 27, 2010	
											NTS	
											W31	

**GENERAL NOTES:**

1. THE RESTRAINT BLOCKS SHALL BE A MINIMUM OF 24" IN HEIGHT AND 12" THICK. THE TOP OF THE BLOCK SHALL BE NO MORE THAN 6" ABOVE TOP OF PIPE.
2. ALL PIPE JOINTS AT 90° BENDS SHALL BE MECHANICAL JOINT WITH MEGALUG OR RETAINING GLAND. FLANGED JOINTS MAY BE USED WHERE CONDITIONS WARRANT.
3. INSTALLATION SHALL BE ENCASED IN A POLYETHYLENE WRAPPER PER AWWA STANDARD C105.
4. SERVICE SADDLE SHALL BE INSTALLED ON THE HIGH POINTS OF THE OFFSET FOR THE INSTALLATION OF AIR/VAC RELEASE VALVE, AS SPECIFIED ON THE PLAN OR BY THE INSPECTOR. SERVICE SADDLE SHALL BE 1" ON 8" AND SMALLER EXISTING MAINS AND 2" ON LARGER EXISTING MAINS.
5. IF BOTTOM CHORD EXCEEDS 18', CONNECT PIPE SECTIONS WITH APPROVED RESTRAINT JOINTS.

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

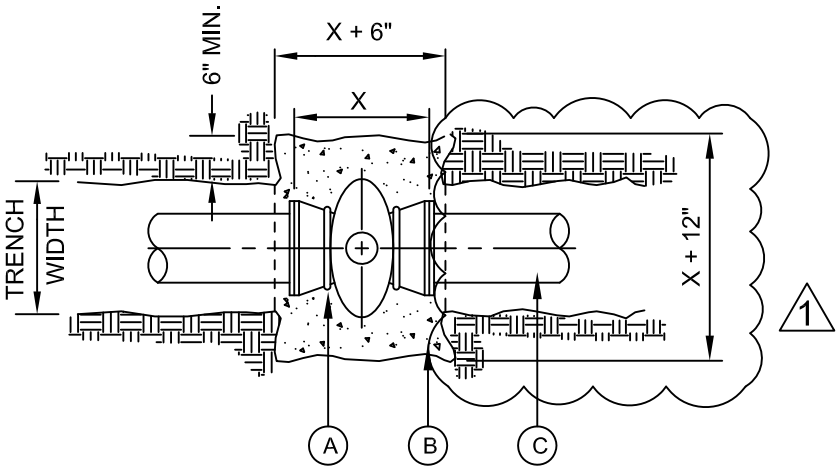
TITLE: 45° MECHANICAL JOINT UTILITY INVERT

PALMETTO STATE UTILITY SERVICES, INC.		REVISIONS						SCALE:	
A Subsidiary of American States Utility Services, Inc.		ZONE	REV.	DESCRIPTION	BY	DATE	APP.	NTS	
Building 2576, Essayons Way Fort Jackson, SC 29207			1	NEW SHEET	SFM	3-16-09		Thursday, May 27, 2010	
Tel: (803) 790-7288 Fax: (803) 787-2054								W32	

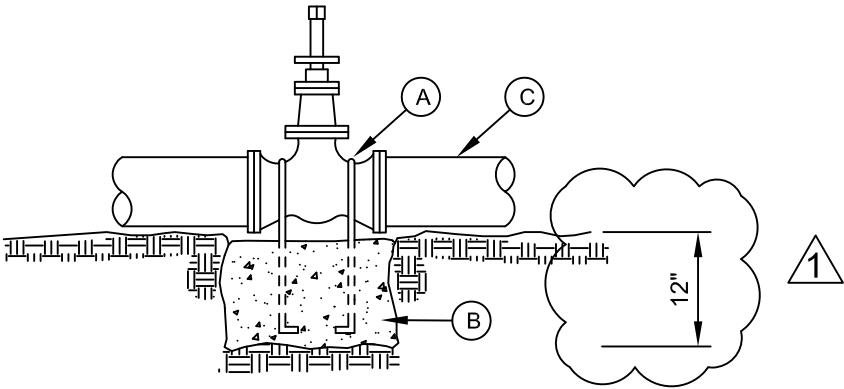
GENERAL NOTES:

- 1. THE ENGINEER SHALL PROVIDE DESIGN FOR ALL VALVES GREATER THAN 12".
- 2. COMPLY WITH REQUIREMENTS OF AWWA C-550, PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES.

- (A) TWO No.5 REBAR HAIR PINS. PAINT UNEMBEDDED PORTION OF REBARS WITH TWO COATS OF COAL TAR EPOXY.
- (B) CONCRETE VALVE SUPPORT, 3000 PSI. CONCRETE.
- (C) APPROVED PIPE.



PLAN



SECTION

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

VALVE ANCHOR



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		REVISIONS			
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	ADDED DIMENSIONS	SFM	3-16-09	

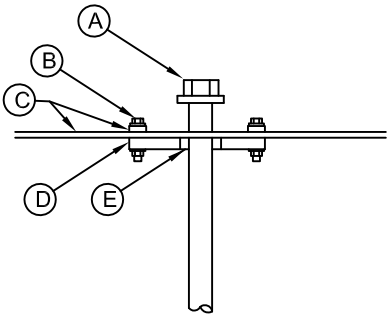
SCALE:
NTS

Thursday, May 27, 2010
W33

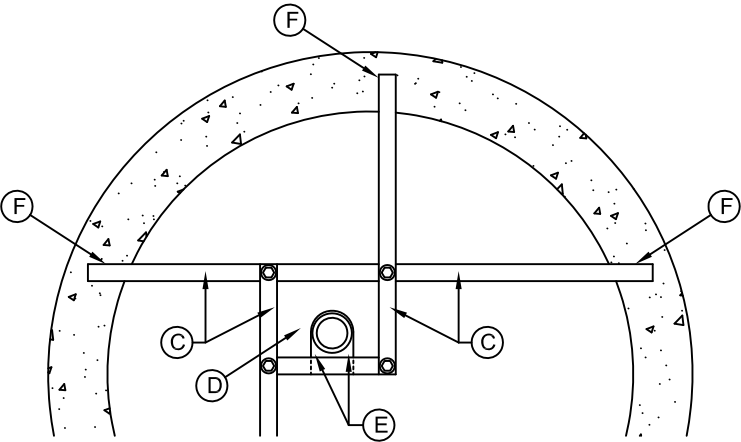
1. 1 1/4" DIAMETER STEEL EXTENSION
STEM WITH SQUARE VALVE NUT AND 2"
SQUARE OPERATING NUT ON TOP.

CONSTRUCTION KEY NOTES:

- (A) 2" SQUARE OPERATOR NUT
- (B) (4) 1/2" SS BOLTS, (4) 1/2" SS NUTS, AND
(8) 1/2" SS WASHERS
- (C) 1"x3/8" STEEL BARS
- (D) STEEL PLATE 6"x4"x1/4"
- (E) NOTCH PLATE TO ALLOW 1/16" CLEAR
FOR STEM.
- (F) EMBED BARS IN MANHOLE WALL



ELEVATION VIEW



PLAN VIEW

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE:

STABILIZER UNIT DETAIL



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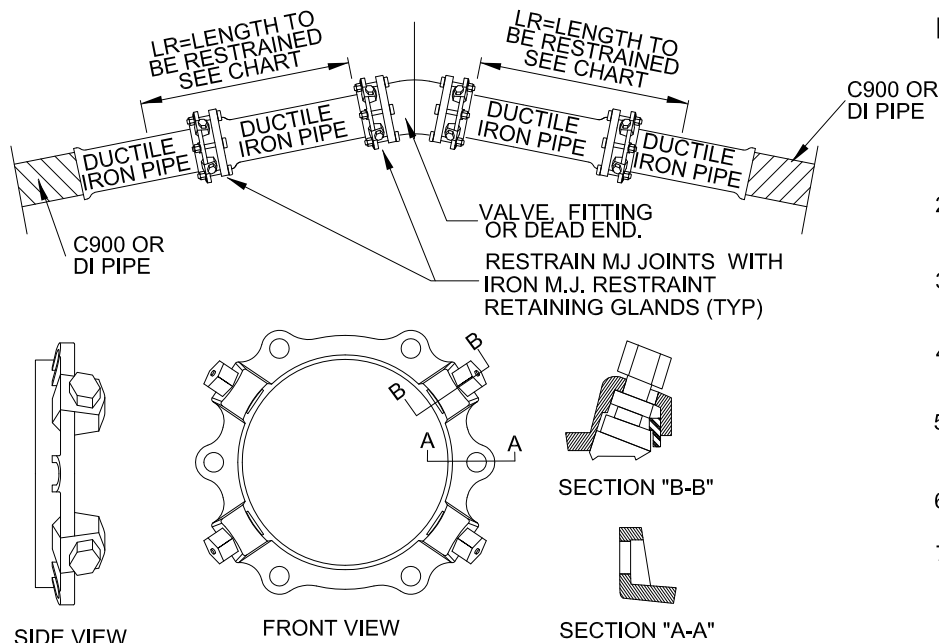
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ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	NO CHANGES	SFM	3-16-09	

SCALE:
NTS

DATE: Thursday, May 27, 2010
TIME: 12:00 PM
W34

NOTES:

- 1.) THRUST RESTRAINT SHALL BE INSTALLED ON DUCTILE IRON WATER DISTRIBUTION LINES 6" THRU 12" DIAMETER IN THE MANNER SHOWN. SEE PSUS STANDARD THRUST BLOCK DETAIL FOR PVC RESTRAINT.
- 2.) IRON RETAINING GLAND M.J. RESTRAINT OR OTHER FORMS OF IRON RESTRAINT SHALL NOT BE USED ON PVC PIPE.
- 3.) PIPE GREATER THAN 12 INCH DIAMETER SHALL REQUIRE RESTRAINT JOINT PIPE FOR THE PROPER LENGTH.
- 4.) COMPACT FITTINGS ARE ACCEPTABLE. FOR USE WITH IRON RETAINING GLAND M.J. RESTRAINT.
- 5.) THE MINIMUM LENGTH OF RESTRAINT INDICATED SHALL REQUIRE ALL JOINTS WITHIN THE LR DISTANCE BE RESTRAINED.
- 6.) RESTRAINT SYSTEM SHALL BE INSPECTED AND APPROVED PRIOR TO BACKFILLING.
- 7.) RESTRAINT SYSTEMS MAY VARY BASED UPON THE ENGINEERS' DESIGN AS SHOWN ON THE PLAN AND PROFILE SHEETS.



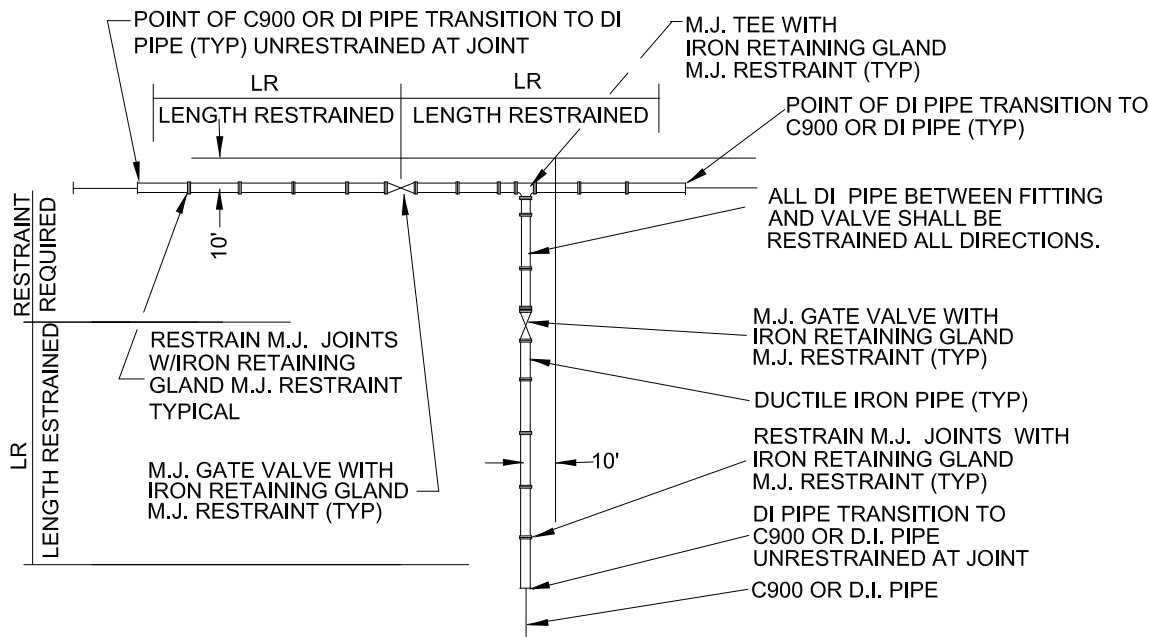
IRON RETAINING GLAND M.J. RESTRAINT			
NOMINAL PIPE SIZE	WEDGES QUANTITY	BOLTS QUANTITY	PRESS RATING
6"	3	6	350
8"	4	6	350
12"	8	8	350

8" SIZE SHOWN 6" & 12" SIMILAR

IRON RETAINING GLAND M.J. RESTRAINT

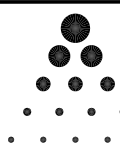
LR (MIN. LENGTH OF RESTRAINT EACH DIRECTION OF THRUST IN LINEAR FEET)
Based on 150 psig pressure, Safety Factor of 2.5:1, BARE DI PIPE AND ML Soil, 3' cover
Chart does not apply to pipes wrapped in polyethylene wrap

PIPE SIZE	VALVES DEAD ENDS TEES	90° ELBOWS	45° ELBOW & CROSSES	22-1/2° ELBOWS	REDUCER
6"	67'	37'	15'	7'	8"X2" 67'
8"	87'	49'	20'	10'	8"X6" 36'
12"	122'	68'	28'	13'	12"X8" 65'

**RESTRAINED JOINT DETAIL FOR TYPICAL TEE INTERSECTION**

4 WAY INTERSECTION SIMILARLY RESTRAINED

STANDARD CONSTRUCTION DRAWING - FORT JACKSON

TITLE: **RESTRAINT DETAIL (DUCTILE IRON PIPE)**

PALMETTO STATE UTILITY SERVICES, INC.

A Subsidiary of American States Utility Services, Inc.

Building 2576, Essayons Way Fort Jackson, SC 29207
Tel: (803) 790-7288 Fax: (803) 787-2054

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ORIGINAL ISSUE DATE		6-11-08	
	1	NEW SHEET	SFM	3-16-09	

SCALE:

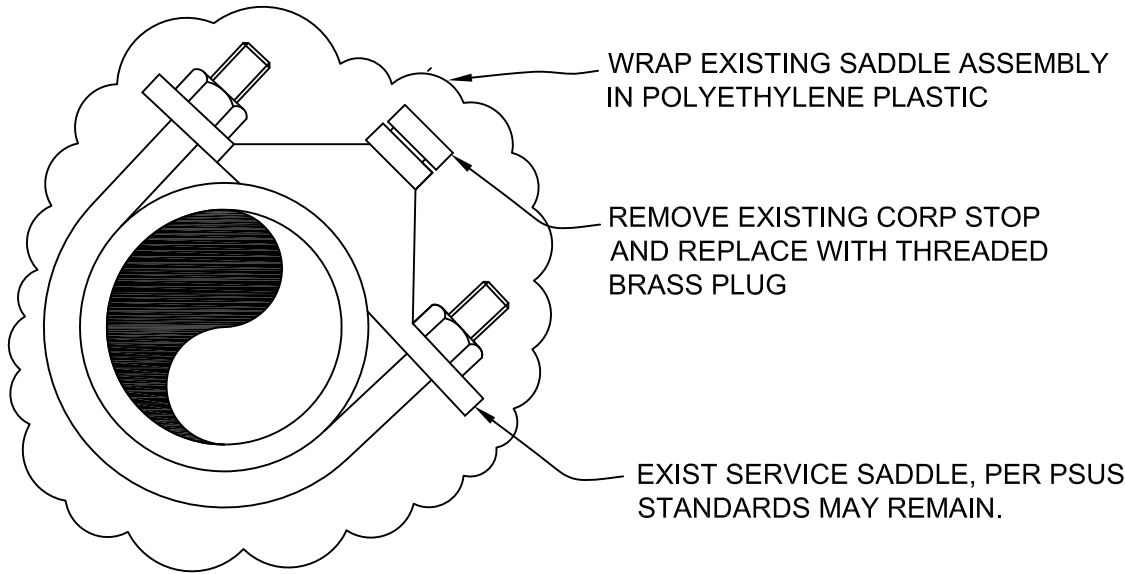
NTS

Thursday, May 27, 2010
W35

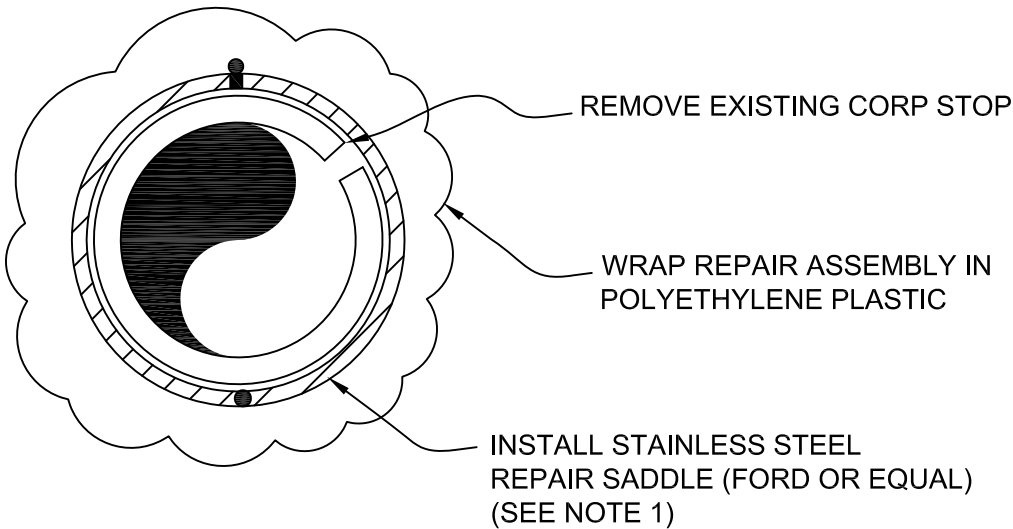
GENERAL NOTES:

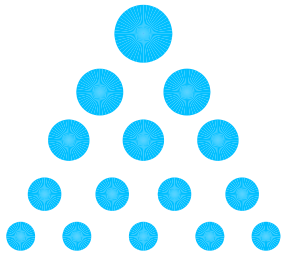
1. WHERE REPAIR CLAMPS WILL NOT FIT PIPE SECTION SHALL BE REMOVED AND NEW SECTION SLEEVED IN.

ABANDONMENT OF EXISTING SERVICE SADDLE



ABANDONMENT OF DIRECT TAP





Palmetto State Utility Services, Inc.

A

Subsidiary of American States Utility Services, Inc.

which is a

Subsidiary of American States Water Company

POTABLE WATER MATERIALS GUIDELINE

for

Fort Jackson

PALMETTO STATE UTILITY SERVICES, INC.

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SECTION 1 - BRASS FITTINGS

Brass fittings for service lines shall meet AWWA Standard C800-01 and have the ability to pass standard pressure testing following installation. For convenience, the following tables list the applicable model numbers of frequently used parts from selected manufacturers. All fittings shall be designed for high-pressure per AWWA C 800-01 Section 4.2.3 (150 psi).

1.1 Service Saddles**Size of Main x CC Thread**

PIPE TYPE	MANUFACTURERS MODEL NUMBER					
	JONES	FORD	MUELLER	ROMAC	SMITH/ BLAIR	A. Y. MCDONALD
PVC PIPE C – 900	J996	S90	H13400 series	202BS	393	3805
DUCTILE IRON	-----	FC202	DR2S series	202N	391	----
AC PIPE CL 150 – 200	J979	202B	BR2B series	202B	323	3825
STEEL MAINS	-----	F202	BR2A series	202	313	----

Size of Main x FIP

PIPE TYPE	MANUFACTURERS MODEL NUMBER		
	FORD	JONES	MUELLER
PVC PIPE C-900	S 91 (6" and 8") 202BS (10" and larger)	J-996 (6" and 8") J-969 (10" and larger)	H-13400 series

1.2 Corporation Stops

SIZE AND CONNECTIONS	MANUFACTURERS MODEL NUMBER			
	FORD	JONES	MUELLER	A.Y. MCDONALD
1" CC X COPPER PACK JOINT	F1000	J3401	H15008	4701-22
1" CC X PE PACK JOINT	F1001	J3402	H15009	4701-33
1" CC X MIP	F400	J45	H9996	3128
2" CC X COPPER PACK JOINT	FB1000	J1937	H15013	4701B-22
2" CC X PVC PACK JOINT	FB1002	J1977	P25008	4701B-44

1.3 Angle Meter Valves

SIZE AND CONNECTIONS	MANUFACTURERS MODEL NUMBER			
	FORD	JONES	MUELLER	A.Y. MCDONALD
3/4" COPPER PACK JOINT X METER NUT	KV43-332W	J4201	H14258	4602-22
1" COPPER PACK JOINT X METER NUT	KV43-444W	J4201	H14258	4602-22
1" PE PACK JOINT X METER NUT	KV63-444W	J4202	H14259	4602-33
1" FIP X METER NUT	KV13-444W	J1527	H-14265	4604
2" COPPER PACK JOINT X METER FLANGE	FV43-777W	J1975	B-24276	4602B-22
2" PVC PACK JOINT X METER FLANGE	FV73-777W	J1979	-----	4602B-44

1.4 Ball Valve Curb Stops

SIZE AND CONNECTIONS	MANUFACTURERS MODEL NUMBER			
	MUELLER	FORD	JONES	A.Y. MCDONALD
1" COPPER PACK JOINT X COPPER PACK JOINT	B-25209	B44-444	J1949	6100-22
1" FIP X FIP	B-20283	B11-444W	J1900	6101W
2" PVC PACK JOINT X PVC PACK JOINT	-----	B77-777	J1900 with 2-J2640	6100-44

1.5 Straight Couplings and Adapters

SIZE AND CONNECTIONS	MANUFACTURERS MODEL NUMBER			
	MUELLER	FORD	JONES	A.Y.MCDONALD
3/4" COPPER PACK JOINT X COPPER PACK JOINT	H-15403	C44-33	J2609	4758-22
3/4" PE PACK JOINT X COPPER PACK JOINT	H-15428 w/ H-15454	C46-33	J2612	4758-22-33
1" COPPER PACK JOINT X COPPER PACK JOINT	H-15403	C44-44	J2609	4758-22
1" PE PACK JOINT X COPPER PACK JOINT	H-15428 w/ H-15454	C46-44	J2612	4758-22-33
1" FIP X COPPER PACK JOINT	H-15451	C14-44	J2607	4754-22
2" COPPER PACK JOINT X COPPER PACK JOINT	H-15403	C44-77	J2609	4758-22
2" FIP X PVC PACK JOINT	----	C17-77	J2640	4754-44
1" PVC PACK JOINT X MIP	H-15429	C87-44	-----	4753-44
1" METER NUT X MIP	H-10896	C38-44- 2	J130	4620

1.6 Ell Couplings and Adapters

SIZE AND CONNECTIONS	MANUFACTURERS MODEL NUMBER			
	MUELLER	FORD	JONES	AY MCDONALD
3/4" MIP X COPPER PACK JOINT	H-15531	L84-33	J2619	4799M-22
1" COPPER PACK JOINT X COPPER PACK JOINT	H-15526	L44-44	J2611	4761-22
1" FIP X COPPER PACK JOINT	H-15533	L14-44	-----	4779-22
2" COPPER PACK JOINT X COPPER PACK JOINT	H-15526	L44-77	J2611	4761-22

1.7 Other Brass Fittings

DESCRIPTION	MANUFACTURERS MODEL NUMBER	
	FORD	MUELLER
1" BRANCH PIECE TEE, FIP X MIP	TSS1-444,U18-44-8	----
1" STRAIGHT CHECK VALVE, FIP X FIP	HS11-444	H-14244
ANGLE STOP	KV43-444WW	H-14258

SECTION 2 - DUCTILE IRON OR CAST IRON FITTINGS

2.1 Adapters, Bends, Caps, Crosses, Reducers, Sleeves, and Tees

Ductile Iron or Cast Iron fittings such as bends, tees, crosses, reducers, caps, and sleeves shall meet AWWA Standard C110 for Standard Size Fittings or AWWA Standard C153 for compact fittings. End connections shall be Mechanical Joint, Flanged, or Plain End as specified on the plans.

2.2 Gate Valves

Resilient wedge gate valves, including tapping valves, shall meet AWWA Standard C509 or C515. All gate valves must open to the left.

2.3 Butterfly Valves

Unless otherwise specified, all butterfly valves shall be pressure Class 150 with a manual actuator and wrench nut (2-inch square) and shall comply with AWWA Standard C504. All interior and exterior ferrous surfaces of valves shall be coated per AWWA C550.

2.4 Check Valves

Unless otherwise specified, all check valves shall be resilient seated check valves in compliance with AWWA C508-01. All interior and exterior ferrous surfaces shall be coated per AWWA C550.

2.5 Dry Barrel Fire Hydrant Bury

Unless otherwise specified, a 6" x 48", 6-hole, Ductile Iron, Dry Barrel Fire Hydrant Bury with Mechanical Joint Fittings shall be installed. All fire hydrants shall be Mueller Super Centurion A423 5 1/4-inch main valve with megalug flanges.

2.6 Fire Hydrant Check Valve

Check valves may only be installed with wet barrel fire hydrants. The following manufacturers are acceptable:

- Mueller

2.7 Fire Hydrant Spools

Break-away fire hydrant spools shall be cast iron with either 6 or 8 holes. In conjunction with the break-way spools, hollow bolts shall be installed.

2.8 Repair Clamps and Bands

Repair clamps shall be of full circle all stainless steel design. The following manufacturers are acceptable:

MANUFACTURER	ALL STAINLESS STEEL
Ford	FS1/FS2
Romac	SS1/SS2
Smith Blair	261/262
Mueller	540-550
TPS	EZ-MAX 4000

2.9 Compression Fittings for Steel and PVC Piping

Compression Fittings for Steel and PVC piping shall be manufactured by Total Piping Solutions – Series 6000.

SECTION 3 - OTHER FITTINGS

3.1 Tapping Sleeves

All tapping sleeves shall be full-circle type and comprised of stainless steel exterior band. All tapping sleeves shall include a full-circle positive seal. Tapping sleeves that only seal around the opening in the pipe are not acceptable.

The following are acceptable manufacturers for Stainless Steel Tapping Sleeves for attaching to A.C., D.I., PVC, or Steel mains (except size-on-size steel):

MANUFACTURER	STAINLESS STEEL FLANGE
Ford	Fast
Romac	SST
Smith Blair	662
Powerseal	3480AS
JCM	432

Welded Tapping Sleeves shall be used for size-on-size connections to steel mains. The following style is acceptable:

- Weld Nozzle with full wrap reinforcing pad at center line.

3.2 Flex Couplings, Transition Couplings, and Flange Coupling Adapters

Flex Couplings, Transition Couplings and Flange Coupling Adapters should have a Ductile Iron Barrel and End Rings. If this is not available due to transition sizes, the coupling shall be fabricated from steel and epoxy coated inside and out. The following manufacturers are acceptable:

- Romac
- Ford
- Dresser
- Smith Blair
- TPS
- Hydro – Flex 3000 (can be used as a coupling or repair band)
- Viking Johnson or Mueller “Maxifit”

- Gradelok

3.3.1 Automatic Control Valves - Globe Style

Hydraulically operated globe style automatic control valves, including Pressure Regulating Valves, Pressure Sustaining Valves and Rate of Flow Control Valves shall be manufactured by the following:

- Cla-Val Company

3.3.2 Automatic Control Valves - Roll Seal Type

Hydraulically operated roll seal type automatic control valves, including Pressure Regulating Valves, Pressure Sustaining Valves and Rate of Flow Control Valves shall be manufactured by the following:

- Cla-Val Company

3.4 Air and Vacuum Release Valves

Air and Vacuum Release Valves shall meet the requirements of AWWA Standard C512-04.

3.5 Joint Restraints

The following joint restraint systems are acceptable:

- Ford Uni-Flange, Series 1400
- EBBA Iron Mega-Lug
- US Pipe Field Lock Rubbers

3.6 Expansion Joints

The following expansion joint manufacturers are acceptable:

- Romac (Double Ball Flexijoint)
- EBAA Iron Sales (Flex-Tend)

SECTION 4 - PIPE AND TUBING

4.1 Ductile Iron Pipe

Ductile Iron Pipe shall meet AWWA Standard C151. Unless otherwise specified, it shall be Pressure Class 350 with push on fittings.

4.2 PVC Pipe (C-900)

PVC pipe size 4" to 12" shall meet AWWA Standard C900. Unless otherwise specified, 4" pipe shall be Class 200 (DR14) and 6" through 12" pipe shall be Class 150 (DR18).

4.3 Tubing (Services)

3/4", 1" and 2" Tubing shall be DR9. 1/4" and 3/8" shall be Refrigeration Tube.

4.4 PVC Pipe (Sch 40 or Sch 80)

1" and 2" PVC pipe shall be for potable water. Use Schedule 40 or 80 as specified on the plans.

SECTION 5 - FIRE HYDRANTS & POST INDICATOR VALVES "PIVs"**FIRE HYDRANT GUIDE**

MILITARY INSTALLATION	SYSTEM(S)	FIRE DEPT.	FH TYPE	NOMINAL SIZE*	ACCEPTABLE MODEL
FORT. JACKSON	ALL AREAS	FORT JACKSON FD	DRY BARREL/ IRON BODY	6" X 4" X 2½" X 2½"	MULLER SUPER CENTURION #A423 (5¼")

FOR RESIDENTIAL AREAS, HIGHER LAND USES MAY REQUIRE MORE OUTLETS.

POST INDICATOR VALVE "PIV" GUIDE

MILITARY INSTALLATION	SYSTEM(S)	FIRE DEPT.	ACCEPTABLE MODEL
FORT JACKSON	ALL AREAS	FORT JACKSON FD	MULLER A423

SECTION 6 - VAULTS, METER BOXES, AND GATE VALVE BOXES**6.1 Vaults**

The following are acceptable models of concrete/polymer vaults with torsion spring assisted metal lids.

a. Non-Traffic Bearing

- H & C
- Best
- Brooks
- J & R
- Bilco
- Armorcast
- Pre-Con

- Carson LLC
- New Basis

b. Traffic Bearing

- Brooks
- Bilco
- Armorcast
- Carson LLC
- New Basic

6.2 Meter Boxes

The following tables list acceptable models of meter boxes. Boxes listed for 5/8" and 3/4" meters are for replacement of existing boxes of the same size.

Non Traffic Bearing

Meter Size	Minimum Meter Box ID	Manufacturer			
		Brooks	Armorcast	Carson LLC	New Basis
5/8" x 3/4"	9" x 14" (replacement only)	3MB	A6000494	N/A	WFB0914122AOC
1"	12" x 22" (new)	37MB	P6000485 A6000485 A6000485SA	MSBCF1118-12XL	WFB1220122AOC
2"	16" x 29" (new)	65MB	A6000164PCX12	MSBCF1730-12	WFB1730122AOC

6.2.1 Meter Lids and Covers

Meter Size	Minimum Meter Box ID	Manufacturer		
		Carson LLC	New Basis	Armorcast
5/8" x 3/4"	9" x 14" (repl. Only)	MN00109 cover	WPC0914A02A0BWM	A6000482 A6000482T (20K)
5/8" - 1"	12" x 22" (new)	MSBCF1118SPCPD cover MSCBC101 drop in lid	WPC1220B12A0AOO drop in cover WPC0509A02A0BWM drop in lid	A6000484DQ drop in cover A6000487 drop in lid A6000484 1 pc cover A6000484T 1 pc cover
1-1/2" & 2"	16" x 29" (new)	MSCBC1730RPCV16 cover MN00109drop in lid	WPC1730B22A0BOO drop in cover WPC0914A02A0BWM drop in lid	A60001643DZ drop in cover A60001947TDZ drop in cover

6.3 Gate Valve Boxes

The following are acceptable models of gate valve boxes:

- Brooks RT - 1
- Christie G-5
- Standard 8” C.I. Cover w/ appropriate PSUS, Inc. logo

SECTION 7 - WATER SAMPLING STATIONS

The following table lists acceptable models of Water Sampling Stations.

APPLICATION	MANUFACTURER	MODEL
Non-Freezing	Hydro-Guard	BSS-01 w/TCV

Palmetto State Utility Services, Inc.

A

Subsidiary of American States Utility Services, Inc.

which is a

Subsidiary of American States Water PSUS

TECHNICAL PIPELINE INSTALLATION SPECIFICATIONS

Prepared by

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PALMETTO STATE UTILITY SERVICES, INC. “PSUS”

TECHNICAL PIPELINE INSTALLATION SPECIFICATIONS

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PALMETTO STATE UTILITY SERVICES, INC. “PSUS”

TECHNICAL PIPELINE INSTALLATION SPECIFICATIONS

SECTION 1 - GENERAL

1.1 Scope of Work: The Contractor shall furnish, supply, provide, assemble, have fabricated all materials, plant and equipment needed for project; provide all supervision, labor and services to carry out the project; provide all utilities and transportation, power, fuel and water, insurance, taxes, machinery, equipment (vehicles and otherwise), apparatus, tools and other means of construction; services of subcontractors and vendors, testing and restoration of paving and other existing physical conditions disturbed by the contractor’s work.

1.2 Quality Assurance: This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

ANSI B16.1-89	Cast Iron Pipe Flanges and Flanged Fittings Class 150
ANSI B16.5-88	Pipe Flanges and Flanged Fittings
ASTM A126-84	Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A536-84	Ductile Iron Castings
ASTM D1248-84	Polyethylene Plastics Molding and Extrusion Materials
ASTM D1784-90	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D2241-89	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Joints for Drain and Sewer Plastic Pipe Using Flexible Elastomeric Seals
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F789	TYPE PS-46 and TYPE PS-115 Polyvinyl Chloride (PVC) Plastic Grading, Flow Sewer Pipe and Fittings
ASTM F1417	Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low Pressure Air
AWWA C105	Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
AWWA C110	Ductile-Iron and Gray-Iron Fittings, 3 Inches through 48 Inches, for Water and Other Liquids
AWWA C111	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
AWWA C115	Flanged Ductile-Iron and Gray-Iron Pipe with Threaded Flanges

AWWA C151	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
AWWA C600	Installation of Ductile-Iron Water Mains and their Appurtenances
AWWA C651	Disinfecting Water Mains
AWWA C900	Polyvinyl Chloride (PVC) Pressure Pipe, 4 Inches though 12 Inches, for Water
SPC	Standard Plumbing Code of the SBCCI
UPC	Uniform Plumbing Code
ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800
ASTM A126	Gray Iron Castings for Valves, Flanges, and Pipe Fittings
AWWA C500	Gate Valves for Water and Sewerage Systems
ASTM C478	Precast Reinforced Concrete Manhole Section
ASTM C891	Practice for installation of Underground Precast Concrete Utility Structures
ASTM D1227	Specification for Emulsified Asphalt Used as a Protective Coating for Buildup Roofing
FEDSPEC SS-S-	Sealing Compound, Preformed Plastic for Pipe Joints
	00210
AWWA C502-85	Dry-Barrel Fire Hydrants
UL 246-79	Hydrants for Fire-Protection Service

Installation of water mains and appurtenances shall be conducted in accordance with Section C of the AWWA Standards referenced above and/ or manufacturer's recommended installation procedures.

All pipe material, solder and flux shall be lead free (less than 0.2% lead in solder and flux and less than 8.0% lead in pipes and fittings).

Lubricants which will support microbiological growth shall not be used for potable water pipeline slip-on joints. Vegetable shortening shall not be used to lubricate joints.

On potable water facilities, natural rubber or other material which will support microbiological growth may not be used for any gaskets, O-rings, and other products used for jointing pipes, setting meters or valves, or other appurtenances which will expose the material to the water.

1.3 Construction Documents: The work shall be performed in accordance with Palmetto State Utility Services, Inc. "PSUS" and/or ASUS (hereafter referred to as "PSUS") General Conditions, Supplemental General Conditions, Supplemental Conditions, these specifications, the attached PSUS plans and Standard Construction Drawings. All facilities installed under these Specifications shall be in accordance with the applicable PSUS Standard Construction Drawings unless superseded by a note or detail on the plan.

1.4 Permits: No construction work shall commence until all required Permits have been issued. The Contractor is to comply with all terms of the Construction/ Encroachment/ Excavation/ Right-of-Way Permit issued by the local jurisdiction(s) including

cooperating with the local jurisdiction's contractors and employees. The permit conditions shall take precedence over information shown on the plan(s) or given in the specifications. Contractor is responsible for compliance with state and local waste discharge requirements and Best Management Practices (BMPs).

In addition to any permits that the PSUS has obtained or will obtain for this project, the Contractor is obligated to obtain any additional permits required by the local agency, including providing proof of any required insurance and / or obtaining a business license and / or providing any bonding or other documents for the actual construction itself. A copy of any such additional permit is to be given to PSUS.

- 1.5 Traffic Control:** The Contractor may be required by the local jurisdiction to prepare and submit to the local jurisdiction for approval a traffic control plan. If such is required, a copy of the traffic control plan shall be filed with PSUS. The local jurisdiction may require that the traffic control plan be prepared to a specific standard. Construction must be in accordance with the approved traffic control plan.

1.6 Local Jurisdiction Requirements:

- 1.6.1** Unless prior written approval is obtained from the local jurisdiction(s) construction is limited to working hours per local jurisdiction's Ordinances, Resolutions and/or permit(s).
- 1.6.2** Spoils, backfill material, pipeline materials, or equipment shall not be left by the contractor on any public right-of-way job sites, without the prior written authorization of the local jurisdiction and PSUS.
- 1.6.3** All pavement striping, stop bars, legends, traffic signs, traffic control loops, or other traffic control facilities or other structures or features owned by public bodies or by private owners that are damaged or altered during construction shall be replaced as directed by the local jurisdiction or property owner.

1.7 General Construction Requirements:

- 1.7.1** Access to sites shall be by public right-of-ways and utility easements. Other access locations required shall be secured by the contractor at no additional expense to PSUS. Supplemental erosion control measures shall be required to include construction entrances, silt fencing, restoration, etc. Additional measures shall be included as part of a supplemental erosion control plan prepared by the contractor.
- 1.7.2** The contractor shall be required to provide the construction staging area at his expense. The contractor is expected and required to cooperate with the Fort Jackson DPW or property owners affected by the work. Private agreements with such parties must be in writing on a form approved by the engineer and a copy shall be provided to the engineer prior to proceeding with construction activities affected by said agreement. The agreement must specify that PSUS, Fort Jackson and the engineer shall be held harmless against all claims arising from the agreement. PSUS discourages private agreements. Before final acceptance, a release from each party that the contractor has made an agreement with shall be required. The property owner's release is a condition of final acceptance.

- 1.7.3 Contractor shall maintain a neat and clean job-site to include staging/storage areas as follows:
- Perform dust control by watering daily or as directed by the engineer. - sweep streets a minimum of once weekly (Friday) or as directed by the engineer.
 - Blade, level and re-compact all exposed trenches weekly (or as directed by the engineer) to produce a smooth "ride".
 - Perform daily clean-up of all dirt, debris and scrap materials.
 - Remove excess equipment, materials, tools, etc. Not needed.
- 1.7.4 Excess suitable soil excavated during construction shall be stockpiled for use on the project or disposed of off-site as directed by the engineer. The contractor shall not be allowed to stockpile materials or excess materials in the street right-of-ways at any time. The contractor shall provide a sufficient and suitable stockpile area and location at the contractor's expense.
- 1.7.5 Contractor shall provide measures during construction to secure the site and excavation from the general public and comply with all OSHA regulations. Job site safety is the exclusive and sole responsibility of the contractor. Open excavation left unattended or overnight is not acceptable and shall be filled immediately.
- 1.7.6 Contractor shall repair or replace drives disturbed by construction to existing or better conditions. No separate payment unless otherwise indicated.
- 1.7.7 Contractor shall provide temporary fencing where fences are removed for construction. Contractor shall coordinate fence removal/reinstallation with housing authorities or individual property owners prior to removal. Contractor shall reinstall all sheds, fences, etc. to as good as or better than existing conditions unless otherwise indicated (no separate payment).
- 1.7.8 Contractor shall replace all disturbed mailboxes, signs, etc. disturbed during construction within 24 hours of disturbance. Permanent road signage disturbed shall be replaced immediately and if necessary roadway signs shall be temporarily installed in a location consistent with the Fort Jackson traffic control requirements to provide continuous traffic awareness of roadway conditions (no separate payment).
- 1.7.9 Contractor shall provide security fencing, security guard, and any and all other measures contractor deems necessary to protect equipment and materials stored on the project (no separate payment).
- 1.7.10 Where contractor ceases work operations for a 72 hour period or longer, such as holidays, etc., the following shall be accomplished prior to the work stoppage. A. Contractor shall store all equipment in the contractor staging area or off site. B. The contractor shall sweep all streets, perform general cleanup and shall perform maintenance on all exposed patches.
- 1.7.11 Contractor shall schedule work and material deliveries so that stored material quantities on the job site shall be minimized.
- 1.7.12 Contractor shall store all materials in the contractor staging area 72 hours prior to incorporating into the work to reduce obstructions to traffic and inconvenience to residents. Where utilities are being constructed in easements out of traffic areas,

contractor may store materials ahead of construction for a distance not greater than 1800 feet unless approved otherwise by the engineer.

- 1.7.13 At the Fort Jackson DPW or property owner's request, the contractor shall dig up existing shrubs and bushes within utility easement to be disturbed by construction and set outside the utility easement area in a location determined by the property owner (no separate payment). Property owner will be responsible for replanting shrubs and bushes so removed, and shall be responsible for reestablishing growth. If no request is made by the property owner, disturbed shrubs and bushes shall be removed and disposed of off-site unless otherwise indicated.
- 1.7.14 Clearing and grubbing shall be restricted to permanent easements only. Contractor shall limit tree/bush clearing in the temporary easements, between houses and along property lines to only absolutely necessary for construction.
- 1.7.15 The notes contained herein are intended to supplement the technical specifications provided by the engineer and provide easy reference for the contractor. In no case shall these notes void any part, section or requirement outlined in the technical specifications contained in the contract documents. If conflicts occur between the technical specifications and the notes contained herein, the technical specifications shall supersede.
- 1.7.16 Photographs contained on drawings are for information purposes only and the contractor shall not rely on the limited number of photographs as being representative of actual site conditions. Contractor is charged with performing site investigations to ascertain existing site conditions.

1.8 General Utility Requirements

- 1.8.1 Prior to commencement of any work within easements or rights-of-ways the contractor is required to notify concerned utility companies in accordance with local requirements. Contractor shall verify location of existing utilities prior to beginning construction (no separate payment). Existing utilities shown are taken from maps furnished by various utility companies and have not been physically located (i.e. Telephone, gas, cable, etc.).
- 1.8.2 The contractor shall dig up each utility which may conflict with construction 14 days in advance to verify locations (horizontally and vertically) to allow the engineer an opportunity to adjust the design to avoid conflicts (no separate payment).
- 1.8.3 All sanitary sewer & water construction shall be in accordance with standards and specifications of PSUS. Storm drainage, street construction and paving shall be in accordance with the Fort Jackson Directorate of Public Works.
- 1.8.4 Utility services to individual properties are not shown in the profiles for simplicity of the drawings. Services may include water laterals, telephone, electric, cable, gas, etc.
- 1.8.5 Contractor shall coordinate with utility owner and Fort Jackson and be responsible for temporary relocation and/or securing existing utility poles and signs and/or utilities in accordance with utility owner requirements during the utility main installation and street construction. (no separate payment).
- 1.8.6 Contractor shall provide temporary supports for utility crossings and repair damages due to construction to the satisfaction of the utility involved at no additional expense to PSUS. Underground electrical crossings shall be crossed in

accordance with the technical specification section underground electrical crossing requirements.

- 1.8.7 Where deemed necessary by the engineer that a subsurface drainage system is required, the contractor shall provide all materials, tools, labor, equipment, tie-in's to existing drainage structures and all other incidentals necessary to provide complete installation in accordance with the directorate of public works standards of Fort Jackson. Improperly installed and non-functioning drainage shall be removed and replaced at the contractor's expense. Existing french drainage damaged during construction shall be replaced and or repaired at no additional expense to PSUS.
- 1.8.8 Storm drainage repairs by contractor due to construction damage and joints exposed during construction shall be inspected by PSUS representative or engineer prior to backfilling.
- 1.8.9 All utility locations shall be coordinated, implemented, and in-place 2 weeks prior to commencement of work.

1.9 Traffic Control Requirements

- 1.9.1 Contractor shall provide traffic control plans for work zone traffic control to the directorate of public works of Fort Jackson. Contractor shall not place any traffic control devices without having approval from Fort Jackson DPW (or traffic).
- 1.9.2 Contractor shall insure access to all properties by property owners and tenants/users at all times.
- 1.9.3 Contractor shall notify the directorate of public works, Fort Jackson two weeks in advance of any road closings and coordinate all road closings/utility interruptions with affected tenants/users 2 weeks prior to closing/interrupting services.
- 1.9.4 Minimum one way traffic shall be maintained at all times unless road closure is approved by the Directorate of Public Works and Fort Jackson traffic in writing 5 days in advance of road closure. An approved detour plan prepared by the contractor shall be required and the measures installed prior to closure.
- 1.9.5 Contractor shall coordinate/notify traffic services daily (before 4:00 p.m.) as to which streets will be under construction impeding traffic flow the following day.
- 1.9.6 The contractor shall not impede traffic at any time until the approved traffic control devices are in place.
- 1.9.7 All traffic control measures, devices, installation, methods, sequencing and plans shall be in strict accordance with manual of uniform traffic control devices and supplements such as SCDOT and/or Fort Jackson traffic.
- 1.9.8 Notify Fort Jackson DPW Service Order Desk at (803)-751-7684/7685 prior to beginning construction.
- 1.9.9 Work shall not begin until after the traffic control and erosion control devices have been installed to the satisfaction of Fort Jackson.
- 1.9.10 Trenching, bore pits and/or other excavations shall not be left open or unsafe overnight.
- 1.9.11 Strict compliance with the "policies and procedures for accommodating utilities on highway rights of way" shall be required
- 1.9.12 All lanes of traffic are to be open during the hours of 6:00 am to 9:00 am and from 4:00 pm to 6:00 pm. Traffic will be maintained at all times.

- 1.9.13 Any work requiring equipment or personnel within 5' of the edge of the travel lane shall require a lane closure with appropriate tapers.
- 1.9.14 During non-working hours, equipment shall be parked as close to the right of way line as possible and shall be properly barricaded so that no equipment obstruction shall be within the clear recovery area.
- 1.9.15 All roadway signs which are removed due to construction shall meet Fort Jackson standards and shall be reinstalled as soon as possible.
- 1.9.16 Excavation material shall not be placed on the pavement. Drainage structures shall not be blocked with excavation materials.
- 1.9.17 The length of parallel excavation shall be limited to the length necessary to install and back fill one joint of pipe at a time not to exceed (25) feet.

1.10 Wetland Construction Requirements

- 1.10.1 Construction limits/corridor (including roads and stockpile area) to a maximum 40 foot width.
- 1.10.2 Post construction ground contours and elevations must be restored to the original elevations.
- 1.10.3 The top 6" to 12" of the trench shall be backfilled with the topsoil and/or soil existing prior to construction.
- 1.10.4 Excess material must be removed to upland areas and disposed of off-site. Temporary placement/stockpile for absolute minimum period of time.
- 1.10.5 Disturbed slopes and stream banks must be stabilized immediately upon completion of the utility line or immediately at each stream crossing.
- 1.10.6 Notify DPW Engineer and receive written approval prior to beginning construction.
- 1.10.7 Install anti-seep collars every 150 feet or as shown on plans.
- 1.10.7 No fertilizer shall be applied within 10 feet of stream.
- 1.10.8 No fresh concrete shall be in contact with streams.
- 1.10.9 Seeding shall be in accordance with the specified mixture for wetland areas.

SECTION 2 - MATERIALS

- 2.1 General:** The Contractor shall furnish all of the material needed to complete the project, including supplementary materials, such as lock rings, couplings, disinfecting material, paint, resurfacing material, and concrete, unless noted otherwise on the construction plans. All material shall be per the construction plans and applicable PSUS Standard Construction Drawings. All material shall be in accordance with the latest edition of PSUS's "Potable Water Materials Guideline".

All material shall be inspected by PSUS before installation. Substitution of any material must be approved by an authorized PSUS representative.

All materials/products that contact potable water must be third party certified as meeting the specifications of ANSI/NSF Standard 61. The certifying party shall be accredited by the ANSI.

2.2 Piping Materials:

2.2.1 Water: See PSUS's Potable Water Materials Guideline".

2.2.2 Wastewater: PVC SDR 35 pipe will be used for gravity sewer pipes

SECTION 3 – LINES AND GRADES

3.1 Subdivisions & Commercial Developments: For installation of water facilities prior to curb and gutter installations, the developer shall provide all necessary line and grade stakes. The Contractor shall preserve all benchmarks, monuments, survey marks and stakes within the project area and in case of their removal or destruction by the Contractor, shall make all arrangements necessary for their replacement at their sole expense.

3.2 Work other than Subdivisions & Commercial Developments: For installation prior to curbs and gutters, unless noted otherwise on the plans, horizontal and vertical control points will be designated on the plans. The Contractor shall establish line and grade relative to these control points. The Contractor shall preserve all bench marks, monuments, survey marks, and stakes, and in case of their removal or destruction by him or his employees, shall be liable for the cost of their replacement.

Where indicated on plans, Contractor shall have the line and grade established by a State licensed land surveyor or engineer qualified to perform surveying.

SECTION 4 - INSTALLATION

4.1 Inspection of Materials: Factory test markings shall appear on all pipe when delivered. Field inspection shall be made to detect any damage resulting from shipment or handling, and all damaged materials shall be rejected. Pipe couplings and rubber rings shall be checked for proper diameter and size. If rubber rings show check lines because of age, they shall be rejected.

4.2 Underground Service Alert: The Contractor shall contact and obtain a permit from the applicable underground service alert organization at least two (2) working days (forty-eight (48) hours minimum) prior to the day of the Pre-Construction meeting.

4.3 Potholing: Contractor shall pothole and verify the location of all underground utility crossings noted on the construction documents prior to starting work. The Contractor's attention is directed to the possible existence of underground facilities not shown or shown in a different location from that shown on the construction documents.

4.4 Trench Dimensions: All trench excavations shall provide for a minimum cover of 36 inches over the top of the pipe as measured from the gutter flow line unless the cover is otherwise noted on the plans. The trench shall follow a true and straight alignment in the location shown on the plans. Any deviation necessitated by unforeseen conditions must be approved by PSUS before proceeding with the work. The width of trench excavation shall be 18 inches for pipe sizes less than 8 inches in diameter. For pipe sizes 8 inches in

diameter or larger the trench shall have a minimum width of the outside diameter of the pipe plus 12 inches but not greater than pipe OD plus 24 inches. The trench shall be excavated at a minimum of 6 inches deeper than the grade of the bottom of the pipe. Trench excavation greater than 5 feet in depth will require a Trench Safety Excavation Plan which shall comply with OSHA requirements and must be approved by PSUS before proceeding with the work.

4.5 Handling of Pipe:

- 4.5.1** Lift pipe using spreader beams that provide 3rd point lifting of pipe sections over 30 feet in length.
- 4.5.2** Employ wide belt slings for lifting pipe. Do not use cable slings.
- 4.5.3** Maintain internal bracing until pipe has been placed. Internal bracing shall be provided for all fittings.

4.6 Placement of Pipe:

- 4.6.1** Pipe laying shall include the installation and jointing of the pipe. Preparation of bedding and initial and subsequent backfill shall be as specified in Section 02200. Pipe shall be laid with uniform bearing under the full length of the barrel of the pipe.
- 4.6.2** All pipe shall be installed in strict accordance with manufacturer's recommendations, drawings and/or specifications and in the best commercial trade practice.
- 4.6.3** The Contractor shall perform all work of cutting pipe and fittings or special castings necessary to the proper and accurate assembly, erection and completion of the work. All pipe shall be cut to fit accurately with smooth edges and faces.
- 4.6.4** Any special tools required for laying, jointing, cutting, etc. shall be supplied and properly used. All pipe shall be thoroughly cleaned before laying and shall be kept clean until accepted in the completed work and, when laid, shall conform accurately to the lines and grades given. At all times during pipe laying operations, the trench shall be kept free of water.
- 4.6.5** All pipe and fittings shall be delivered in sound condition. Care shall be taken to protect exterior coatings and linings during all phases of the work. Place no material of any kind inside any piece of pipe or fitting during handling, storage or transit. Pipe and fittings shall be stored in a protected area. Use strap slings for lifting coated pipe.
- 4.6.6** Any section of pipe damaged and determined by the Engineer to be not acceptable for use shall be replaced with an undamaged section at the expense of the Contractor.
- 4.6.7** All piping systems shall be constructed from the materials shown and to the lines, grades and dimensions shown. Where not shown, the pipes shall be located to avoid interference with other features.
- 4.6.8** Bell-and-spigot pipe shall be laid with the bells upgrade. All types of piping shall be laid and fitted together so that, when complete, the pipe will have a smooth and uniform invert.
- 4.6.9** Each length of pipe laid shall be thoroughly swabbed to remove all foreign material before the next length is laid. Each pipe shall be inspected for defects before being lowered into the trench.

- 4.6.10** All piping for which no location dimensions are shown shall be installed in a neat and workmanlike manner in accordance with the best trade practice. Wherever possible, runs and rises shall be grouped and kept parallel. It shall be the Contractor's responsibility to properly lay out all piping to clear obstructions such as equipment, larger sized pipes, etc.
- 4.6.11** Under no conditions shall the pipe be laid against the trench wall. Extra precaution shall be taken to prevent rocks or other large objects from lodging against the pipe encasement during backfill.
- 4.6.12** In case defects are revealed by inspection, the Contractor shall replace the defective pieces and shall bear the expense. All pipe and fittings shall be carefully cleaned before laying. Precautions shall be taken to prevent foreign material from entering the pipe. Pipe shall be cut only to remove defective ends, for inserting fittings in their designated places or for closing pieces. Such cuts shall be made square with the outside edges slightly beveled.
- 4.6.13** Depressions for pipe bells and couplings shall be hand excavated. If full bearing is not evident, the bedding surface shall be reshaped or additional bedding material added until full bearing is achieved.
- 4.6.14** All laying operations to provide watertight pipe and pipe joints shall be the responsibility of the Contractor. If adjustment of the position of a length of pipe is required after it has been laid, it shall be removed and rejoined as for a new pipe. Prior to acceptance, the inside of the pipe shall be cleaned and all debris removed.
- 4.6.15** Care shall be exercised to secure true alignment. The rubber gaskets shall be fitted properly in place and lubricated as necessary, and the pipe units shall be fitted together in a manner to avoid twisting or otherwise displacing or damaging the gaskets.
- 4.6.16** All unfinished or abandoned pipelines shall be capped. Caps shall be sufficiently strong to resist backfill pressures and the superimposed loads of construction equipment. The caps shall be sealed to prevent the entrance of soil, moisture and rodents and shall be corrosion resistant. The pipe ends shall be marked in a manner approved by the Engineer.
- 4.6.17** No change in alignment that will create air pockets will be allowed.
- 4.6.18** Jointing materials of approved type shall be installed in strict accordance with their manufacturer's specifications. Pipe joints shall not be deflected in an amount greater than recommended by the manufacturer.
- 4.7 Bedding:** Water pipeline shall be bedded with select sand or select native soil, using full support except at couplings. Sanitary sewer pipeline shall be bedded in 1/4" to 1/2" clean crushed rock. Bedding shall be as follows:
 - 4.7.1** Continuous and uniform bedding shall be provided in the trench for all buried pipe.
 - 4.7.2** Back-fill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe.
 - 4.7.3** Stones, other than crushed bedding, shall not come into contact with the pipe and shall not be within six (6) inches of the pipe.

The use of select native soil is at the discretion of PSUS's authorized representative. The cost of importing sand will be the sole cost of the Contractor. The pipe itself shall be encased with a minimum of 6-inches below and 12-inches above of sand which has a sand equivalence value of 30 or better. Coupling holes shall be of sufficient size so that the pipe may be readily assembled. Wood blocking under the pipe shall not be permitted.

4.8 Pipe Connections: The beveled end of any Polyvinyl Chloride (PVC) pipe shall be cut off before the pipe is inserted into a mechanical joint (MJ) fitting.

4.9 Cutting of Asbestos Cement (AC) Pipe: Whenever it is necessary to cut AC pipe it shall be done with the asbestos cement pipe cutter or tools recommended by the manufacturer. The use of abrasive saws will not be permitted. The cut end of the pipe shall be beveled, smooth, and free of excessive chipping.

Only the "wet-cut" method shall be applied with special emphasis on all applicable OSHA Regulations.

4.10 Repair of Cement Mortar Lining: The Contractor shall repair all cement mortar lining in pipe and fittings damaged. The use of hand holes is permitted where practical. Split welding collars may be used at Contractor's discretion.

4.11 Valves:

4.11.1 Design Criteria: Gate valves 3 inches through 48 inches in size shall comply with AWWA C500, including applicable hydrostatic testing. Gate valves smaller than 3 inches shall be subject to hydrostatic tests at the test pressure.

4.11.2 Material of construction shall be as follows:

<u>Components</u>	<u>Material</u>
4.11.2.1 Body:	
3 inches and smaller	Bronze
Larger than 3 inches	Cast iron, ASTM A126, Class B
4.11.2.2 Wedge:	
3 inches and smaller	Bronze
Larger than 3 inches	Cast iron, ASTM A126, Class B
4.11.2.3 Mounting:	Bronze
4.11.2.4 Stem:	Bronze, AWWA C500
4.11.2.5 Seat rings:	Bronze, Grade A, AWWA C500

Materials specified are considered the minimum acceptable for the purposes of durability, strength, and resistance to erosion and corrosion. The Contractor may propose alternative materials for the purpose of providing greater strength or to meet required stress limitations. However, alternative materials must provide at least the same qualities as those specified for the purpose.

Unless otherwise specified, bronze gate valves shall be provided with resilient seat Muller A-2361 w/Mega-lug system or approved equal.

Iron body valves shall be provided with screwed-on seat rings. Exposed gate valves shall be rising stem type. Buried or submerged gate valves shall be of the non-rising stem type. Rising stem valves and brass non-rising stem valves shall be provided with an O-ring packing. Iron body non-rising stem valves shall be provided with O-ring stem seals.

Gate valve end connections shall be flanged, mechanical joint, or threaded as specified. Threaded ends shall not be provided on gate valves with end connections larger than 4 inches. End flanges shall be integral with the gate valve body and be faced and drilled in accordance with ANSI B16.1 for 150-pound flanges.

MANUAL OPERATORS: Unless specified otherwise, valves less than 12 inch size shall be provided with hand-wheel and valves 12 inches and larger shall be provided with geared operators.

4.11.3 Installation: All valves, including tapping valves, shall be securely supported from underneath to prohibit settlement. Support shall consist of precast mortar blocks or concrete poured on-site, but in no case shall wood blocks be permitted as a permanent means of support. Mud and other unstable material shall be removed as necessary to permit the block to bear on undisturbed material capable of providing adequate support. Valve anchors shall be installed for all valves with mechanical joint (MJ) or Push-On joints, and when indicated on the plans, and shall be constructed in accordance with the applicable Standard Construction Drawings.

The Contractor shall leave all newly installed gate valves in the open position, unless noted otherwise, prior to final acceptance.

4.12 Coupons: All coupons obtained from hot tapping existing mains shall be identified by General Work Order (GWO) number and location and returned to PSUS.

4.13 Thrust Blocks: Adequately sized concrete thrust blocks shall be installed to counteract all thrusts created by internal water pressure during pressure testing. Thrust blocks shall be constructed in accordance with the PSUS Standard Construction Drawings thrust block requirements for the following conditions:

4.13.1 Change of direction, as at tees and bends (vertical or horizontal).

4.13.2 Change of size, as at reducers and at plugged crosses and tees.

4.13.3 At flush-outs and dead-ends.

4.13.4 Thrust at valves.

4.14 Tracer Wire & Tape:

4.14.1 Tracer Wire: – The Contractor shall provide and install tracer wire over all nonmetallic water and wastewater mains. The tracer wire shall be No. 14 gauge, solid, soft drawn insulated copper wire. The tracer wire shall be wrapped around the pipe at 10 ft. intervals and brought up inside each valve can / valve box to within 6 inches of the valve cover.

4.14.2 Magnetic Tape: - Polyethylene magnetic tracer tape shall be as manufactured by Allen Systems, W.H. Brady Co., Seton Name Plate Corporation, Marking Services, Inc., or equal. Tape shall be acid and alkali-resistant, 3 inches wide, 0.005 inch thick, and have 1500 psi strength and 140 percent elongation value. The tape shall be colored the same as the background colors as specified and shall be inscribed with the word "CAUTION-SEWER PIPE BURIED BELOW" for the gravity collection system and the words "CAUTION-WATER PIPE BURIED BELOW" for the water main.

Polyethylene magnetic tracer tape shall be buried 12 to 18 inches below ground and shall be above and parallel to buried nonferrous, plastic and reinforced thermosetting resin pipelines. For pipelines buried 8 feet or greater below final grade, the Contractor shall provide a second line of tape 2.5 feet above and parallel to the buried pipe.

4.15 Gate Cans: The Contractor shall install valve cans on all new valves installed in accordance with applicable PSUS Standard Construction Drawings. Slip cans shall be adjusted to conform to completed street surface and the Contractor shall be responsible for permanent pavement around the valve cans. The Contractor's responsibility to install and maintain valve cans at bid prices shall terminate twenty-four months after acceptance of pipe and valves. For valves to be generally left open, the cap top is to be painted blue. For valves to be generally left closed, the cap top is to be painted red. For valves on fire hydrant laterals, the cap tops are to be painted yellow.

4.16 Services: Services shall be installed in accordance with the applicable PSUS Standard Construction Drawings. The Contractor shall verify the location of all services with the PSUS representative and the subdivider where applicable prior to their installation. Bedding and backfill for services shall be per Sections 4.1.5 and 6.1 herein. For AC and Ductile Iron (D.I.) pipe, the insertion shall be made with a standard Type J drilling and tapping machine for drilling and tapping pipe.

For dry tapping 3/4", 1" and 2" services on PVC pipe, the hole should be bored into the pipe with a hole saw that retains the coupon and allows the shavings to fall clear of the hole. Service saddle shall be centered over the hole, seated and tightened. Then the corporation valve is installed using an approved pipe thread sealant.

The Contractor shall refer to the PSUS Service Survey Report to determine the required service work and location of the work. The Contractor shall confirm the locations with the PSUS representative.

4.17 Fire Hydrants and Fire Services: Fire hydrants and fire services shall be installed in compliance with the corresponding PSUS Standard Construction Drawing. Fire hydrants provided under this section shall be two-piece standpipe and stem, compression shutoff, dry-barrel type. Fire hydrants shall conform to AWWA C502 and shall be listed by Underwriters Laboratories Inc. in accordance with UL 246. Hydrants are to be equipped with 5 1/4 main valve, two 2 1/2-inch hose nozzles with National Standards hose coupling

screw threads; and one 4-inch I.D. Pumper Nozzle. Nozzle caps shall have one inch square or 5-sided nuts. Nozzle cap gaskets are to be provided without chains.

- 4.17.1** The operating nut shall also be one inch square or 5-sided and the hydrant is to open by turning the nut left (counter clockwise). Top of stem shall have O-ring type seals. The color of finish paint above the ground line shall be per Standard Construction Drawing W12. Fire hydrants shall be installed as shown on the W12 drawing. Fire hydrants shall meet the factory and field test provisions of AWWA C502. An Affidavit of compliance with AWWA C502 and records of standard tests shall be provided.
- 4.17.2** The Contractor shall confirm the location with the PSUS representative and the Fire Department where applicable. Conflicts or deviations from the plans shall be brought to the attention of the PSUS representative prior to installation. Any changes in the location of fire hydrants must be approved by the applicable Fire Department.
- 4.17.3** Contractor shall provide and install a burlap sack over out of service or newly installed hydrants. This sack shall remain in place until the hydrant is placed in service.

4.18 Manholes:

- 4.18.1** Standard manholes for sanitary sewers shall be constructed of precast units. Adequate foundations for all manhole structures shall be obtained by removal and replacement of unsuitable material with well-graded granular material.
- 4.18.2** Base shall be a well-graded granular bedding course conforming to the requirements for sewer bedding but not less than 4 inches in thickness and extending either to the limits of the excavation or to a minimum of 12 inches outside the outside limits of the base section. In the latter case, the balance of the excavated area shall be filled with select material well tamped to the level of the top of the bedding to positively prevent any lateral movement of the bedding when the weight of the manhole is placed upon it. The bedding course shall be firmly tamped and made smooth and level to assure uniform contact and support of the precast elements.
- 4.18.3** Precast concrete manhole sections shall conform to the requirements of ASTM C478 or C139. Cement shall be ASTM C150, Type II. Minimum wall thickness for non-reinforced sections shall be 5 inches. Minimum wall thickness for reinforced sections shall be 5 inches. Joints shall be tongue and groove mortared, rubber gasket or mastic unless otherwise specified.
- 4.18.4** The precast base section shall be carefully placed on the prepared bedding so as to be fully and uniformly supported in true alignment, and making sure that all entering pipes can be inserted on proper grade.
- 4.18.5** Cast-in-place bases shall be at least 10 inches in thickness and shall extend at least 6 inches radially outside of the manhole wall. Concrete shall have minimum of 4000 psi 28-day compression strength as provided in Section 03300.
- 4.18.6** The first precast section shall be placed on the cast-in-place base structure before the base has taken initial set, and shall be carefully adjusted to true grade and alignment with all inlet pipes properly installed so as to form an integral,

watertight unit. The first section shall be uniformly supported by the base concrete, and shall not bear directly on any of the pipes.

4.18.7 Final elevation and tilt of cover shall conform to the restored street surface unless otherwise specified. Manhole castings shall be readjusted to meet uniform street grades. Warping of surfacing to meet grade of castings will not be allowed. Not less than 8 inches or more than 24 inches shall be provided between the top of the cone or slab and the underside of the manhole casting ring for adjustment of the casting to street grade or ground surface.

4.18.8 Locking manhole covers shall be required for areas of known vandalism. Contractor/designer shall consult with PSUS to determine if locking covers are required.

4.18.9 Sealed manhole covers are required at sewer forcemain discharge manholes, sewer forcemain air vacuum/air release vaults, or wherever a high odor potential exists.

4.19 Abandonment of Mains: Unless noted otherwise, the following work shall be done to mains that are noted on the plans as “To be abandoned”.

1. Transfer services to live main as directed by plans and/or Service Survey Report.
2. Sever main from active facilities. Plug “live” ends with Cast Iron Plugs or other suitable material as directed by plans and an authorized PSUS representative. Plug “dead” ends with concrete.
3. Remove gate cans on abandoned pipelines. Backfill, compact, and resurface per the requirements of Section 6.

4.20 Abandonment of Services: Services that are to be abandoned shall be cut and plugged at the main.

4.21 Disposal of Removed Materials:

4.21.1 General: All removed materials, except those indicated on the plans or described herein to remain the property of PSUS, shall become the property of the Contractor and shall be disposed of in accordance with local, state, and federal laws. Should any of those materials be considered as hazardous the Contractor shall provide PSUS with paper custody trail documentation of the disposal. Existing facilities to be salvaged and returned to PSUS, if any, will be designated by PSUS prior to demolition and either removed by PSUS before the contractor’s work is to begin or the contractor will be directed to remove the designated item and deliver it to PSUS.

4.21.2 Asbestos Cement (AC) Pipe Removal and Disposal:

All efforts should be made to remove AC pipes as unbroken sections of pipe. Asbestos encapsulate spray or an equivalent shall be used on pipe ends and edges, drilled holes, and loose fragments of removed pipes.

Entire lengths of pipe should be wrapped as individual pieces. (Do NOT cut or break AC pipe into smaller pieces or sections.) Pipes shall be placed in a leak-tight material (i.e., polyethylene), wrapped in a "burrito" fashion, and sealed with duct tape. Polyethylene bags/sheets with a minimum thickness of 6 mils shall be used. Cut, broken, or cracked sections of pipe should be placed in a plastic sheet-lined drum with a lid, if possible, or wrapped and sealed in polyethylene bag.

The Following Asbestos-hazard warning labels shall be placed on all bags, packages, and containers of AC pipe.

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

AC pipe shall be disposed of in the following manner.

Manifest (Non-hazardous Waste). A written manifest shall be completed by the contractor and submitted to the transporter, if different, and landfill PSUS.

Registered hazardous waste transporters shall be contracted to transport AC pipe waste to approved landfills.

SECTION 5 - PROTECTIVE MATERIALS

5.1 Steel Facilities: The Contractor, as a part of his work under these specifications, shall provide cathodic protection to all exposed steel surfaces, flex couplings, repair clamps, service saddles, in all other instances in which dissimilar metals are in contact with each other installed under this contract, and to all steel surfaces exposed in the performance of this work.

Materials to be used in providing this protection shall be as follows unless otherwise specified on the Contract installation drawing:

- 5.1.1** Coal-tar primer for use under bituminous tape.
- 5.1.2.** 10 mil Bituminous tape.
- 5.1.3** Coal-tar mastic.
- 5.1.4** NSF – 61 Compliant Fusion – Bonded Epoxy Coating.

Adjacent wraps of tape shall overlap a minimum of 1/2-inch. The tape shall be applied with sufficient tension to conform to surface irregularities of the metal and existing coating, and shall be applied in accordance with the printed instructions of the tape manufacturer. The tape shall extend a minimum of one pipe diameter on either side of the exposed surface. If the integrity of the existing coating is questioned, the wrap shall be extended to those limits established by the PSUS representative.

The use of coal tar mastic as the only protective coating or lining shall be restricted to those uses where the application of tape would be exceedingly difficult and time consuming as determined by the PSUS representative. In those situations where mastic only is used, the Contractor shall take all measures necessary to protect the coating against damage during backfill operations.

- 5.2 Ductile Iron Pipe:** The Contractor shall encase Ductile Iron Pipe in Polyethylene Encasement per AWWA Standard C105, latest revision.

SECTION 6 - BACKFILL, COMPACTION AND RESURFACING

- 6.1 Backfill and Compaction:** Backfill shall be considered as starting 12 inches above the top of the pipe. All material below this point shall be considered as bedding and shall conform to the requirements established in Section 4.1.5 herein.

All backfill installed within public right-of-way shall meet the minimum requirements of the permitting agency, hereinafter called Grantor. Minimum compaction shall be 90% in backfill and 95% in base material.

All other backfill shall be per Section 306-1.3 of the latest edition of the Standard Specifications for Public Works Construction, except rocks greater than 4 inches in any dimension shall not be permitted in the trench backfill. Where rocks are included in the backfill, they shall be well graded with suitable finer material to fill voids and provide for a homogeneous mix of material. The cost of importing any required backfill material and of hauling away spoil shall be at the Contractor's sole expense.

Compaction tests shall be required on all work unless waived by the PSUS representative. The test shall comply with ASTM D1556: Test Method for Density of Soil in Place by the Sand-Cone Method, or equivalent with respect to accuracy and acknowledged as equivalent by a licensed geotechnical engineer in the state of South Carolina. The test shall be made and certified by a State certified soils testing service. All compaction tests shall be performed as directed by the Grantor and shall be at the Contractor's expense. The Contractor shall have compaction tests performed at those locations specified by the Grantor. However, at least one test shall be performed for every 300 lineal feet of pipe installed and at least one test per job unless waived by PSUS. The location of the tests shall be determined by PSUS or Grantor.

- 6.2 Resurfacing:** The Contractor shall start placement of permanent resurfacing material as required by the Grantor but no more than seven (7) working days after the acceptance of the main installation by PSUS, and shall continue to completion. The Contractor shall notify the Grantor of their intent to place permanent resurfacing material at least 48 hours prior to resurfacing. Permanent resurfacing shall meet the requirements of the Grantor.

If not indicated on the plans, the Contractor is responsible to contact the local jurisdiction governing agency and determine the backfill and/or resurfacing requirements prior to submittal of his bid. All costs for backfill and/or resurfacing shall be included therein.

SECTION 7 - PRESSURE TESTING – WATER & WASTEWATER SYSTEMS Pressures, media, test durations deflections, mandrel requirements, infiltration/infiltration testing, shall be as specified in the applicable local state administrative code. Equipment which may be damaged by the specified test conditions shall be isolated. Testing shall be performed using calibrated test gages and calibrated volumetric measuring equipment to determine leakage rates. Each test gage shall be selected so that the specified test pressure falls within the upper half of the gage's range. Unless otherwise specified, the Contractor shall notify the Engineer 48 hours prior to each test. Unless otherwise specified by the bid documents, wastewater system lines shall be video logged with 2 CD/DVD copies provided to the PSUS.

7.1 Water Systems: Testing, Cleaning, & Flushing:

7.1.1 Testing: Prior to bacteriological sampling and flushing, the Contractor shall pressure test the line under the inspection of the PSUS representative. Pressure and leakage tests must be conducted in accordance with AWWA Standards C600. The pressure must be at least 1.5 times the maximum working pressure at the point of testing for at least two (2) hours. The formula to be used for calculating the maximum allowable leakage per hour shall be:

Ductile Iron:

$$L = [SD(P)^{1/2}] \times 133,200$$

L = allowable leakage (gals./hr.)

S = length of the pipeline tested (feet)

D = diameter of pipe (inches)

P = average test pressure (psig)

PVC:

$$L = [ND(P)^{1/2}] \times 7,400$$

L = allowable leakage (gals./hr.)

N = # of joints in pipeline being tested

D = diameter of pipe (inches)

P = average test pressure (psig)

All visible leaks shall be repaired regardless of the amount of leakage. The test shall be made by placing temporary plugs or bulkheads in the pipe and filling the line slowly with water. The Contractor shall be responsible for ascertaining that all test plugs/bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, the adjacent pipe. Care shall be taken to see that all air vents are open during filling. Any piping which fails the test shall be repaired.

During the first hour, leakage shall not exceed the quantities calculated. No pressure drops shall be permitted during the second hour period. Any leaks developed or discovered under this test shall be repaired immediately, and the line shall be retested until it successfully maintains the test pressure for 2 hours without exceeding allowable leakage values calculated. Water required to fill the segment of new main for hydrostatic pressure testing shall be supplied through a temporary connection between the PSUS distribution system and the new main. The temporary connection shall include a backflow prevention device and shall be disconnected (physically separated) from the new main during the hydrostatic pressure test. The Contractor may pressure test against a newly installed closed gate valve.

Any chlorinated water resulting from leaks must be de-chlorinated to non-detectable levels before reaching catchment basins, storm drains, or natural waterways. Contractor

is responsible for compliance with state and local waste discharge requirements and Best Management Practices.

If any pipe, special fittings, valves or appurtenances fail during the test or after installation, the Contractor shall remove and replace all failed materials with appropriate new material, and correct any damages to surrounding facilities. The cost of any necessary repair shall be considered the Contractor's sole cost.

7.2 Wastewater Systems – Cleaning, Flushing & Testing:

7.2.1 Cleaning: Piping systems shall be cleaned following completion of testing and prior to connection to operating, control, and regulating or instrumentation equipment. The Contractor may, at his option, clean and test sections of buried or exposed piping systems. Use of this procedure, however, will not waive the requirement for a full pressure test of the completed system. Unless specified otherwise, piping 24 inches in diameter and smaller shall first be cleaned by pulling a tightly fitting cleaning ball or swab through the system.

7.2.2 Flushing: Prior to testing, all pipelines shall be flushed or blown out as appropriate. The Contractor shall test all pipelines either in sections or as a unit. The test shall be conducted in accordance with the applicable local state administrative code. The Contractor shall be responsible for ascertaining that all test plugs/bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, the adjacent pipe.

7.2.3 Testing: The testing of the installed pipe shall include infiltration, exfiltration or low pressure air test and deflection conducted in accordance to the applicable local state administrative code.

7.2.3.1. Infiltration/Exfiltration - When pipes are installed below the groundwater level, an infiltration test shall be used in lieu of the exfiltration test. This test shall be in accordance to the applicable local state administrative code.

7.2.3.2. Low Pressure Air Test - Prior to testing, the section of the pipeline to be tested shall be filled at a rate which will not cause any surges. After the section of pipeline has been filled, the gravity sewer shall be placed under pressure in accordance with the applicable local state administrative code between the manholes. The pipeline shall then be brought up to the test pressure specified for each pipe diameter in the applicable local state administrative code and that pressure shall be maintained on the section under test for a period of not less than the specified time shown on the table.

7.2.3.3. Deflection Testing - Deflection tests shall be performed on all flexible pipe. This test shall be conducted after the final backfill has been in place at least 30 days. The test and methods shall be conducted in accordance to the applicable local state administrative code.

7.3 Wastewater Systems – Manhole Testing: Upon completion of installation, manholes shall be tested. Test shall be either exfiltration or vacuum test, as set out below, at Contractor's option.

7.3.1 Exfiltration Test: Plug all inlets and outlets and fill manhole with water to a height determined by the Engineer's Representative. Allow filled manhole to stand until it has reached its maximum absorption, but not less than 2 hours. Re-establish head. Measure amount of water required to maintain test head during a

2-hour test period. Leakage as measured by this test shall not exceed 0.1 gallons per hour per foot of manhole diameter per foot of head above manhole invert (or foot of head above groundwater level, if groundwater is above manhole invert).

- 7.3.2 Vacuum Test:** Upon completion of manhole barrel installation, plug all inlets and outlets and insert rubber ring "donut" type plug in cone opening. Attach vacuum pump to hose connected to plug in cone and apply 4 psi of vacuum (install vacuum regulator on pump such that maximum applied vacuum is 10 psi). After vacuum has stabilized at 3.5 psi for 1 minute, test shall begin. During test period, manhole shall lose no more than 0.5 psi of vacuum. Specified test periods are as follows:

Manhole depth,	Test period,
feet	Min.
0-5	4.5
5-10	5.5
10-15	6.0
Greater than 15	6.5

SECTION 8 - DISINFECTION

- 8.1 General:** As each joint of pipe is installed, it must be tilted so that all foreign material spills out of the pipe before being laid in the trench. Particular care must be exercised at all times to make certain that no foreign material enters the pipe during installation.

At the close of a day's work or whenever the workman are absent from the job, all open sections of installed pipe shall be plugged, capped or otherwise tightly sealed to prevent entry of any foreign material.

Before connection to existing mains, all new mains and repaired portions thereof or extensions to existing mains shall be flushed to clean and then chlorinated as described in the following section.

8.2 Chlorination of Pipeline Installations:

Disinfection of all new water mains shall be in accordance with current American Water Works Association (AWWA) Standard C651 for the disinfection of water mains. In general, one approved method referred to as "continuous feed method" is as follows:

- 8.2.1 Before being placed in service, all new mains shall be thoroughly flushed then chlorinated with not less than twenty-five (25) milligrams per liter of available chlorine.
- 8.2.2 Water from the existing distribution system or other source of supply shall be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine.
- 8.2.3 The solution shall be retained in the pipeline for not less than twenty-four (24) hours and then flushed thoroughly with a potable water of satisfactory bacteriological quality before starting the sampling program.
- 8.2.4 The contractor or owner shall collect a minimum of two (2) samples from each sampling site for total coliform analysis. The number of sites depends on the amount of new construction but must include all dead-end lines, be representative of the water in the newly constructed mains, and shall be collected a minimum of every 1,200 linear feet.
- 8.2.5 Prior to sampling, the chlorine residual must be reduced to normal system residual levels or be non-detectable in those systems not chlorinating.
- 8.2.6 These samples must be collected at least twenty-four (24) hours apart and must show the water line to be absent of total coliform bacteria.
- 8.2.7 The chlorine residual must also be measured and reported.
- 8.2.8 If the membrane filter method of analysis is used for the coliform analysis, non-coliform growth must also be reported.

8.2.9 If the non-coliform growth is greater than eighty (80) colonies per one hundred (100) milliliters, the sample result is invalid and must be repeated.

8.2.10 All samples must be analyzed by a State certified laboratory.

The Contractor shall provide a plan for PSUS approval which describes the chlorination process to be used, showing the location of sampling points and the sampling and disinfection equipment to be used. The use of liquid chlorine (gas) is not permitted.

Pipeline segments may be chlorinated against newly installed closed valves. Valve must be identified as closed by putting a red 2x4 in the valve can and using a red valve can lid. Water required to fill the segment of new main for disinfection shall be supplied through a temporary connection between the distribution system and the new main. The temporary connection shall include an approved backflow prevention assembly.

Flushed water must be de-chlorinated so that no water entering a catch basin or natural water way will have a detectable chlorine residual.

If subsequent disinfection processes are required, the total cost of additional re-disinfection and bacteriological testing is to be borne by the Contractor.

SECTION 9 – WARRANTY / GUARANTEE

9.1 General: The Contractor shall guarantee all workmanship and material utilized in the installation for a period of two years from the date of acceptance of facilities by PSUS and such guarantee shall include prompt repairs of trench subsidence as may be required by the local jurisdiction governing agency. Should the Contractor fail to perform such repairs on a timely basis, PSUS may elect to perform such work itself and bill the Contractor for same.

****END OF TECHNICAL PIPELINE INSTALLATION SPECIFICATIONS****

Appendix CC- SCDHEC Standards for Stormwater Management and Sediment Reduction

SOUTH CAROLINA DEPARTMENT OF
HEALTH AND ENVIRONMENTAL CONTROL



Standards for Stormwater Management and Sediment Reduction
Regulation 72-300 thru 72-316

June 28, 2002

Bureau of Water

DISCLAIMER

This copy of the regulation is provided by DHEC for the convenience of the public. Every effort has been made to ensure its accuracy; however, it is not the official text. DHEC reserves the right to withdraw or correct this text if deviations from the official text as published in the State Register are found.

72-300. Scope.

- A. Stormwater runoff is a source of pollution of waters of the State, and may add to existing flooding problems. The implementation of a statewide stormwater management and sediment control program will help prevent additional water quantity and quality problems and may reduce existing problems.
- B. Stormwater management and sediment control plan approvals are necessary prior to engaging in any land disturbing activity related to residential, commercial, industrial or institutional land use which are not specifically exempted or waived by these regulations.
- C. To the extent possible, the Commission intends to delegate the provisions of these regulations to local governments. Those program provisions which are subject to delegation include stormwater management and sediment control plan approval, construction and maintenance inspections, enforcement, and education and training.
- D. The Commission encourages the implementation of the Stormwater Management and Sediment Reduction Act on a watershed basis by local governments. The Commission recognizes that all jurisdictions may not have the resources available to implement this type of program immediately. However, the comprehensive approach of implementing the program on the watershed basis will allow for planned, orderly development in a watershed.
- E. The implementation of a stormwater utility represents a comprehensive approach to program funding and implementation. The activities which may be undertaken by a stormwater utility include not only assessment, collection, and funding activities, but also carrying out provisions of adopted stormwater management plans. These provisions may include contracting for such services as project construction, project maintenance, project inspection, and enforcement of installation and maintenance requirements imposed with respect to approved land disturbing activities.

72-301. Definitions.

As used in these regulations, the following terms shall have the meanings indicated below:

- 1. “Adverse Impact” means a significant negative impact to land, water and associated resources resulting from a land disturbing activity. The negative impact includes increased risk of flooding; degradation of water quality; increased sedimentation; reduced groundwater recharge; negative impacts on aquatic organisms; negative impacts on wildlife and other resources; and threatened public health.

2. “Applicant” means a person, firm, or governmental agency who executes the necessary forms to obtain approval or a permit for a land disturbing activity.
3. “Appropriate Plan Approval Agency” means the Commission, Local Government, or Conservation District that is responsible in a jurisdiction for review and approval of stormwater management and sediment control plans.
4. “As-Built Plans or Record Documents” means a set of engineering or site drawings that delineate the specific permitted stormwater management facility as actually constructed.
5. “Best Management Practices” means a wide range of management procedures, schedules of activities, prohibitions on practices and other management practices which have been demonstrated to effectively control the quality and/or quantity of stormwater runoff and which are compatible with the planned land use.
6. “Certified Construction Inspector” means a person with the responsibility for conducting inspections during construction and maintenance inspections after the land disturbing activity is completed as certified by the Commission.
7. “Certified Plan Reviewer” means a person with the responsibility for reviewing stormwater management and sediment control plans for an appropriate plan approval agency as certified by the Commission.
8. “Commission” means the South Carolina Land Resources Conservation Commission.
9. “Delegation” means the acceptance of responsibility by a Local Government or Conservation District for the implementation of one or more elements of the statewide stormwater management and sediment control program.
10. “Designated Watershed” means a watershed designated by a local government and approved by the Commission, Department of Health and Environmental Control and the South Carolina Water Resources Commission and identified as having an existing or potential stormwater, sediment control, or nonpoint source pollution problem.
11. “Detention Structure” means a permanent stormwater management structure whose primary purpose is to temporarily store stormwater runoff and release the stored runoff at controlled rates.
12. “Develop Land” means to change the runoff characteristics of a parcel of land in conjunction with residential, commercial, industrial, or institutional construction or alteration.

13. “Developer” means a person undertaking, or for whose benefit, activities covered by these regulations are commenced and/or carried out.
14. “District” means any soil and water conservation district created pursuant to Chapter 9, Title 48, S.C. Code of Laws.
15. “Drainage Area” means that area contributing runoff to a single point.
16. “Easement” means a grant or reservation by the owner of land for the use of such land by others for a specific purpose or purposes, and which must be included in the conveyance of land affected by such easement.
17. “Erosion” means the wearing away of land surface by the action of wind, water, gravity, ice, or any combination of those forces.
18. “Erosion and Sediment Control” means the control of solid material, both mineral and organic, during a land disturbing activity to prevent its transport out of the disturbed area by means of air, water, gravity, or ice.
19. “Exemption” means those land disturbing activities that are not subject to the sediment and stormwater requirements contained in these regulations.
20. “Grading” means excavating, filling (including hydraulic fill) or stockpiling of earth material, or any combination thereof, including the land in its excavated or filled condition.
21. “Implementing Agency” means the Commission, local government, or conservation district with the responsibility for receiving stormwater management and sediment control plans for review and approval, reviewing plans, issuing permits for land disturbing activities, or conducting inspections and enforcement actions in a specified jurisdiction.
22. “Infiltration” means the passage or movement of water through the soil profile.
23. “Land Disturbing Activity” means any use of the land by any person that results in a change in the natural cover or topography that may cause erosion and contribute to sediment and alter the quality and quantity of stormwater runoff.
24. “Natural Waterways” means waterways that are part of the natural topography. They usually maintain a continuous or seasonal flow during the year and are characterized as being irregular in cross-section with a meandering course. Construction channels such as drainage ditches shall not be considered natural waterways.

25. “Nonerodible” means a material, e.g., natural rock, riprap, concrete, plastic, etc., that will not experience surface wear due to natural forces of wind, water, ice, gravity or a combination of those forces.
26. “Local Government” means any county, municipality, or any combination of counties or municipalities, acting through a joint program pursuant to the provisions of this chapter.
27. “Nonpoint Source Pollution” means pollution contained in stormwater runoff from ill-defined, diffuse sources.
28. “One Hundred Year Frequency Storm” means a storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in 100 years. It also may be expressed as an exceedence probability with a 1 percent chance of being equaled or exceeded in any given year.
29. “Person” means any State or federal agency, individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, municipality or other political subdivision of this State, any interstate body or any other legal entity.
30. “Person Responsible for the Land Disturbing Activity” means
 - (a) the person who has or represents having financial or operational control over the land disturbing activity; and/or
 - (b) the landowner or person in possession or control of the land who directly or indirectly allowed the land disturbing activity or has benefitted from it or who has failed to comply with any provision of the act, these regulations, or any order or local ordinance adopted pursuant to this act as imposes a duty upon him.
31. “Post-Development” means the conditions which exist following the completion of the land disturbing activity in terms of topography, vegetation, land use and rate, volume or direction stormwater runoff.
32. “Pre-Development” means the conditions which existed prior to the initiation of the land disturbing activity in terms of topography, vegetation, land use and rate, volume or direction of stormwater runoff.
33. “Redevelopment” means a land disturbance activity that alters the current use of the land but does not necessarily alter the pre-development runoff characteristics.
34. “Responsible Personnel” means any foreman, superintendent, or similar individual who is the on-site person in charge of land disturbing activities.

35. "Retention Structure" means a permanent structure whose primary purpose is to permanently store a given volume of stormwater runoff. Release of the given volume is by infiltration and/or evaporation.
36. "Sediment" means solid particulate matter, both mineral and organic, that has been or is being transported by water, air, ice, or gravity from its site of origin.
37. "Single Family Residence-Separately Built" means a noncommercial dwelling that is occupied exclusively by one family and not part of a residential subdivision development.
38. "Stabilization" means the installation of vegetative or structural measures to establish a soil cover to reduce soil erosion by stormwater runoff, wind, ice and gravity.
39. "Stop Work Order" means an order directing the person responsible for the land disturbing activity to cease and desist all or any portion of the work which violates the provisions of this act.
40. "Stormwater Management" means, for:
 - (a) quantitative control, a system of vegetative or structural measures, or both, that control the increased volume and rate of stormwater runoff caused by manmade changes to the land;
 - (b) qualitative control, a system of vegetative, structural, or other measures that reduce or eliminate pollutants that might otherwise be carried by stormwater runoff.
41. "Stormwater Management and Sediment Control Plan" means a set of drawings, other documents, and supporting calculations submitted by a person as a prerequisite to obtaining a permit to undertake a land disturbing activity, which contains all of the information and specifications required by an implementing agency.
42. "Stormwater Runoff" means direct response of a watershed to precipitation and includes the surface and subsurface runoff that enters a ditch, stream, storm sewer or other concentrated flow during and following the precipitation.
43. "Stormwater Utility" means an administrative organization that has been created for the purposes of planning, designing, constructing, and maintaining stormwater management, sediment control and flood control programs and projects.

44. "Subdivision", unless otherwise defined in an ordinance adopted by a local government pursuant to Section 6-7-1010, means all divisions of a tract or parcel of land into two or more lots, building sites, or other divisions, or parcels less than five acres, for the purpose, whether immediate or future, of sale, legacy, or building development, or includes all division of land involving a new street or a change in existing streets, and includes resubdivision and, where appropriate, in the context, shall relate to the process of subdividing or to the land or area subdivided.
45. "Swale" means a structural measure with a lining of grass, riprap or other materials which can function as a detention structure and convey stormwater runoff without causing erosion.
46. "Ten-Year Frequency Storm" means a storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in 10 years. It may also be expressed as an exceedence probability with a 10 percent chance of being equaled or exceeded in any given year.
47. "Twenty-Five Year Frequency Storm" means a storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in 25 years. It also may be expressed as an exceedence probability with a 4 percent chance of being equaled or exceeded in any given year.
48. "Two-Year Frequency Storm" means a storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in two years. It may also be expressed as an exceedence probability with a 50 percent chance of being equaled or exceeded in any given year.
49. "Variance" means the modification of the minimum sediment and stormwater management requirements for specific circumstances where strict adherence of the requirements would result in unnecessary hardship and not fulfill the intent of these regulations.
50. "Waiver" means the relinquishment from sediment and stormwater management requirements by the appropriate plan approval authority for a specific land disturbing activity on a case-by- case review basis.
51. "Water Quality" means those characteristics of stormwater runoff from a land disturbing activity that relate to the physical, chemical, biological, or radiological integrity of water.
52. "Water Quantity" means those characteristics of stormwater runoff that relate to the rate and volume of the stormwater runoff to downstream areas resulting from land disturbing activities.

53. "Watershed" means the drainage area contributing stormwater runoff to a single point.
54. "Watershed Master Plan" means a plan for a designated watershed that analyzes the impact of existing and future land uses and land disturbing activities in the entire watershed and includes strategies to reduce nonpoint source pollution, to manage stormwater runoff and control flooding. The plan must be developed for the entire watershed, regardless of political boundaries, and must include appropriate physical, institutional, economic and administrative data needed to justify the plan.

72-302. Exemptions, Waivers and Variances from Law.

- A. The following activities are exempt from both the sediment control and stormwater management requirements established by these regulations:
- (1) Land disturbing activities on agricultural land for production of plants and animals useful to man, including but not limited to: forages and sod crops, grains and feed crops, tobacco, cotton, and peanuts; dairy animals and dairy products; poultry and poultry products; livestock, including beef cattle, sheep, swine, horses, ponies, mules, or goats, including the breeding and grazing of these animals; bees; fur animals and aquaculture, except that the construction of an agricultural structure of one or more acres, such as broiler houses, machine sheds, repair shops and other major buildings and which require the issuance of a building permit shall require the submittal and approval of a stormwater management and sediment control plan prior to the start of the land disturbing activity.
 - (2) Land disturbing activities undertaken on forest land for the production and harvesting of timber and timber products.
 - (3) Activities undertaken by persons who are otherwise regulated by the provisions of Chapter 20 of Title 48, the South Carolina Mining Act.
 - (4) Construction or improvement of single family residences or their accessory buildings which are separately built and not part of multiple construction in a subdivision development.
 - (5) Land disturbing activities, other than activities identified in R.72-302A(6), that are conducted under another state or federal environmental permitting, licensing, or certification program where the state or federal environmental permit, license, or certification is conditioned on compliance with the minimum standards and criteria developed under this act.
 - (6) Any of the following land disturbing activities undertaken by any person who provides gas, electrification, or communications services, subject to the jurisdiction of the South Carolina Public Service Commission, or corporations organized and operating pursuant to Section 33-49-10 et seq.:

- (a) land disturbing activities conducted pursuant to a certificate of environmental compatibility and public convenience and necessity issued pursuant to Title 58, Chapter 33, of the South Carolina Code, or land disturbing activities conducted pursuant to any other certification or authorization issued by the Public Service Commission;
- (b) land disturbing activities conducted pursuant to a federal environmental permit, including Section 404 of the Federal Clean Water Act, and including permits issued by the Federal Energy Regulatory Commission;
- (c) land disturbing activities associated with emergency maintenance or construction of electric, gas, or communications facilities, when necessary to restore service or when the Governor declares the area to have sustained a disaster and the actions are undertaken to protect the public from a threat to health or safety;
- (d) land disturbing activities associated with routine maintenance and/or repair of electric, gas, or communications lines;
- (e) land disturbing activities associated with the placement of poles for overhead distribution or transmission of electric energy or of communications services;
- (f) land disturbing activities associated with placement of underground lines for distribution or transmission of electric energy or of gas or communications services; or
- (g) land disturbing activities conducted by a person filing environmental reports, assessments or impact statements with the United States Department of Agriculture, Rural Electrification Administration in regard to a project.

Any person, other than a person identified in R.72-302A(6)(g) who undertakes land disturbing activities described in R.72-302A(6)(d,e,f) must file with the South Carolina Public Service Commission, in a Policy and Procedures Manual, the procedures it will follow in conducting such activities. Any person, other than a person identified in R.72-302A(6)(g), who conducts land disturbing activities described in R.72-302A(6)(b), must address the procedures it will follow in conducting the activities in the Policy and Procedures Manual filed with the South Carolina Public Service Commission to the extent that the land disturbing activities are not specifically addressed in the federal permit or permitting process. If any person, other than a person identified in R.72-302A(6)(g), does not have a Policy and Procedures Manual on file with the Public Service Commission, such manual must be filed with the Public Service Commission not later than six months after the effective date of Chapter 14, Title 48 of the 1976 Code of Laws, South Carolina.

Any person who undertakes land disturbing activities described in R.72-302A(6)(g) of this subsection shall give the same written notice to the commission as given to agencies whose permits are required for project approval by the regulations of the United States Department of Agriculture, Rural Electrification Administration.

- (7) Activities relating to the routine maintenance and/or repair or rebuilding of the tracks, rights-of-way, bridges, communication facilities and other related structures and facilities of a railroad company.
 - (8) Activities undertaken on state-owned or managed lands that are otherwise regulated by the provisions of Chapter 18 of this title, the Erosion and Sediment Reduction Act.
 - (9) Activities undertaken by local governments or special purpose or public service districts relating to the repair and maintenance of existing facilities and structures.
- B. Implementing agencies with responsibility for plan review and approval may grant waivers from the stormwater management requirements of these regulations for individual land disturbing activities provided that a written request is submitted by the applicant containing descriptions, drawings, and any other information that is necessary to evaluate the proposed land disturbing activity. A separate written waiver request shall be required if there are subsequent additions, extensions, or modifications which would alter the approved stormwater runoff characteristics to a land disturbing activity receiving a waiver.
- (1) A project may be eligible for a waiver of stormwater management for both quantitative and qualitative control if the applicant can demonstrate that the proposed project will return the disturbed area to a pre-development runoff condition and the pre-development land use is unchanged at the conclusion of the project.
 - (2) A project may be eligible for a waiver or variance of stormwater management for water quantity control if the applicant can demonstrate that:
 - (a) The proposed project will have no significant adverse impact on the receiving natural waterway or downstream properties; or
 - (b) The imposition of peak control requirements for rates of stormwater runoff would aggravate downstream flooding.
 - (3) The implementing agency will conduct its review of the request for waiver within 10 working days. Failure of the implementing agency to act by end of the tenth working day will result in the automatic approval of the waiver.
- C. The implementing agency with responsibility for plan review and approval may grant a written variance from any requirement of these regulations if there are exceptional circumstances applicable to the site such that strict adherence to the provisions of these regulations will result in unnecessary hardship and not fulfill the intent of these regulations. A written request for variance shall be provided to the plan approval agency and shall state the specific variances sought and the reasons with supporting data for their granting. The plan approval agency shall not grant a variance unless and until sufficient specific reasons justifying the variance are provided by the applicant. The

implementing agency will conduct its review of the request for variance within 10 working days. Failure of the implementing agency to act by the end of the tenth working day will result in the automatic approval of the variance.

72-303. Commission Responsibilities.

- A. The Commission is responsible for the implementation and supervision of the stormwater management and sediment control program which is established by Chapter 14, Title 48, S.C. Code.
- B. The schedule for implementing the Stormwater Management and Sediment Control Act (48-14- 10, et. seq.) has been established by the Commission as follows:

- (1) These regulations are effective and applicable to all land disturbing activities of five acres and greater on October 1, 1992 regardless of program status at the local level. Local governments with existing local programs as of this date shall require that persons responsible for land disturbing activities on sites with disturbed areas of five acres or greater comply with these regulations. Local governments may request assistance from the Commission to implement these regulations on these sites. If a local government does not have a local program on October 1, 1992, the Commission and others shall function as the implementing agencies.

(2) FY 1992-1993

Greenville
Charleston
Richland
Spartanburg
Lexington
Anderson
Horry
York
Berkeley
Aiken
Florence
Sumter
Pickens
Beaufort
Orangeburg

(3) FY 1993-1994

Dorchester
Darlington
Greenwood
Laurens
Oconee
Lancaster
Georgetown
Cherokee
Kershaw
Chesterfield
Williamsburg
Colleton
Marion
Newberry
Chester
Union

(4) FY 1994-1995

Marlboro
Dillon
Clarendon
Abbeville
Fairfield
Barnwell
Lee
Edgefield
Hampton
Bamberg
Saluda
Jasper
Calhoun
Allendale
McCormick

- C. This schedule may be modified by the Commission due to requests from local governments to develop and implement a program prior to the scheduled implementation date. The Commission may also modify this schedule due to personnel or financial resource limitations.
- D. Local governments which adopted stormwater management and/or sediment control programs prior to the effective date of these regulations may continue to administer the existing program until the scheduled implementation date for the local government.

72-304. Criteria for Delegation/Revocation of Programs.

- A. The Commission may delegate the following components of stormwater management and sediment control programs to local governments or conservation districts as follows:
 - (1) Stormwater management and sediment control plan review and approval/disapproval.
 - (2) Inspections during construction and maintenance inspections.
 - (3) Enforcement.
 - (4) Education and training.
- B. The Commission shall grant delegation of one or more program elements to any local government or conservation district seeking delegation that is found capable and meets all of the criteria set forth herein for delegation to comply with Chapter 48, Title 14, 1976 Code and these regulations.
- C. Request for delegation of more than one program element may be accomplished by the submission of one request for all the elements requested. A rejection by the Commission of one element will not jeopardize delegation of other requested program elements.
- D. To be considered capable of providing compliance with Chapter 14 and these regulations, applications for delegation of program elements shall contain the following requisite items:
 - (1) Requests for delegation of stormwater management and sediment control plan review and approval responsibility shall include the following information:
 - (a) Copy of enacted ordinance or program information detailing the plan approval process,
 - (b) Plan review check lists and plan submission requirements,
 - (c) Stormwater management and sediment control criteria, including waiver and variance procedures, that meet minimum standards established by these regulations,

- (d) Description of personnel allocations including qualifications and experience of personnel, description of computer hardware and software resources and expected time frames for plan review which meet the requirements of R.72-305B(2) and R.72- 305M, and
 - (e) Name of the Certified Plan Reviewer.
- (2) Requests for delegation of inspection during construction and of maintenance inspection responsibility shall include the following information:
 - (a) Inspection and referral procedures,
 - (b) Time frames for inspection of active land disturbing activities,
 - (c) Time frames for inspection of completed stormwater management structures,
 - (d) Inspection forms,
 - (e) Description of adequate personnel allocations including qualifications and experience of personnel,
 - (f) Name of Certified Construction Inspector, and
 - (g) Procedures and time frames for processing complaints.
- (3) Request for delegation of enforcement responsibility shall include the following information:
 - (a) Procedure for processing violations.
 - (b) Description of personnel allocations involved in enforcement actions including qualifications and experience of personnel.
 - (c) Description of citizen complaint process.
 - (d) Description of applicant appeal process.
- (4) Requests for delegation of education and training responsibility shall include the following information:
 - (a) Types of educational and training activities to be accomplished,
 - (b) Frequency of activities,
 - (c) Names and backgrounds of those individuals conducting the training, and
 - (d) Procedures and timetables to notify the Commission of educational programs.
- E. Requests for delegation of program elements must be submitted by local governments or conservation districts within six months of the effective date of these regulations, and by January first of subsequent years if delegation is desired at a future date. The Commission shall approve, approve with modification, or deny such a request on or before April first of the year for which delegation is sought.

- F. The S. C. Coastal Council shall assist the Commission in reviewing all requests for delegation of program elements from local governments in the counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Jasper and Horry to ensure that the delegated program elements are consistent with the Coastal Zone Management Program.

The S. C. Coastal Council, in coordination with the Commission, will serve as the implementing agency for these regulations in the jurisdictions of the local governments which do not seek delegation of program elements in the counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry and Jasper.

- G. If the Commission denies a request for delegation, the local government or conservation district may appeal the decision of the Commission by requesting an administrative hearing within 30 days after receipt of written notification as described in R.72-313.
- H. Delegation of authority for one or more program elements may be granted for a maximum time frame of three years. After three years a new application to the Commission must be made. Over the time frame for which delegation has been granted, the Commission will evaluate delegation implementation, coordinate review findings with the delegated authority, and determine if the new delegation should be granted.
- I. A delegated authority may sub-delegate program elements, with Commission concurrence, to a conservation district, regional council of government or other responsible entity or agency.
- J. The Commission shall maintain, and make available upon request, a listing of the current status of delegation for all jurisdictions within the State.
- K. Any local government that has adopted a stormwater management and/or sediment control program prior to the effective date of these regulations may request approval of any, or all, components of its existing program within six months of the effective date of these regulations. The Commission shall give priority to the approval, approval with modification or disapproval of these requests. The local government shall continue to administer the existing program during the review process by the Commission. Efficiency and effectiveness of the existing program shall be considered in the review process.
- (1) The Commission shall approve a delegation request upon determining that the implementation of the existing program by the local government equal or exceed the requirements, criteria, standards and specifications of these regulations.

- (2) If the request for delegation of program components are disapproved, the local government may appeal the decision of the Commission by requesting an administrative hearing within 30 days after receiving written notification of the disapproval as described in R.72-313.
- L. If the Commission determines that a delegated program falls below acceptable standards established by these regulations, delegation may be suspended. During a period of suspension, the Commission shall be responsible for implementation of the program element. The Commission shall collect fees based on R.72-306 for use when the delegation is suspended.
- The following actions may be cause for suspension if they represent a continuing pattern of action or in-action:
- (1) Failure of implementing agency with the responsibility for enforcement to issue a violation in the event of off-site sediment or stormwater damage resulting from non-compliance with the approved plan.
 - (2) Failure of the implementing agency to assess a fine when a violation has not been corrected within the specified time frame.
 - (3) Failure of the implementing agency to stop work when a violation has resulted in off-site damages.
 - (4) Failure of the implementing agency to force compliance with an approved plan.
 - (5) Failure of the delegated program to comply with the provisions of its application for delegation.
- M. Upon suspension of the delegation, the implementing agency has the right to file an appeal within 30 days of the notification of the suspension following procedures listed in R.72-313. The Commission shall administer the program during the appeal process.

72-305. Permit Application and Approval Process.

- A. After the effective date of these regulations, unless a particular activity is exempted by these regulations, a person may not undertake a land disturbing activity without an approved stormwater management and sediment control plan from the appropriate plan approval agency that is consistent with the following items:
- (1) Chapter 14, Title 48, South Carolina Code, relating to erosion and sediment control and stormwater management, and
 - (2) These regulations, or duly adopted county or municipal ordinances or programs that are adopted as a part of the delegation process and set minimum standards equivalent to these regulations.

B. Specific requirements of the permit application and approval process are generally based on the extent of the land disturbing activity. The permit application and approval procedure is as follows:

- (1) For land disturbing activities involving two (2) acres or less of actual land disturbance which are not part of a larger common plan of development or sale, the person responsible for the land disturbing activity shall submit a simplified stormwater management and sediment control plan meeting the requirements of R.72-307H. This plan does not require approval by the implementing agency and does not require preparation or certification by the designers specified in R.72-305H and R.72-305I.
- (2) For land disturbing activities involving more than two (2) acres and less than five (5) acres of actual land disturbance which are not part of a larger common plan of development or sale, a simplified permitting and approval process will be used meeting the requirements of R.72-307I. These activities are required to utilize Best Management Practices (BMP's) to control erosion and sediment and to utilize appropriate measures to control the quantity of stormwater runoff. Plans and specifications for these activities will be prepared by the designers cited in R.72-305H and R.72-305I. The implementing agency will review these submissions within a ten working day period. If action is not taken by the end of the review period, the plan will be considered approved.
- (3) For land disturbing activities disturbing more than five (5) acres, the requirements of R.72-305 and R.72-307 will apply. However, the use of measures other than ponds to achieve water quality improvement are recommended on sites containing less than ten (10) disturbed acres. Plans and specifications for these activities will be prepared by the designers specified in R.72-305H or R.72-305I.
- (4) These requirements may be modified on a case-by-case basis to address specific stormwater quantity or quality problems or to meet S.C. Coastal Council or other regulatory requirements. Requests for waivers or variances from these requirements will be made in accordance with the provisions of R.72-302.
- (5) When the land disturbing activity consists of the construction of a pond, lake or reservoir which is singly built and not part of a permitted land disturbing activity, the following procedures will apply:
 - (a) A stormwater management and sediment control plan will not be required if the pond, lake or reservoir is permitted under the S.C. Dams and Reservoirs Safety Act or has received a Certificate of Exemption from the S.C. Dams and Reservoirs Safety Act. Best management practices should be used to minimize the impact of erosion and sediment.
 - (b) A stormwater management and sediment control plan will be required for the construction of all ponds, lakes or reservoirs not meeting the conditions in R.72- 305B(5)(a) that otherwise meet the size requirements for stormwater management and sediment control plan approval.

- C. A stormwater management and sediment control plan or an application for a waiver shall be submitted to the appropriate plan approval agency by the person responsible for the land disturbing activity for review and approval for a land disturbing activity, unless otherwise exempted. The stormwater management and sediment control plan shall contain supporting computations, drawings, and sufficient information describing the manner, location, and type of measures in which stormwater runoff will be managed from the entire land disturbing activity. The appropriate plan approval agency shall review the plan to determine compliance with the requirements of these regulations prior to approval. The approved stormwater management and sediment control plan shall serve as the basis for water quantity and water quality control on all subsequent construction.
- D. All stormwater management and sediment control plans submitted for approval shall contain certification by the person responsible for the land disturbing activity that the land disturbing activity will be accomplished pursuant to the approved plan and that responsible personnel will be assigned to the project.
- E. All stormwater management and sediment control plans shall contain certification by the person responsible for the land disturbing activity of the right of the Commission or implementing agency to conduct on-site inspections.
- F. The stormwater and sediment management plan shall not be considered approved without the inclusion of an approval stamp with a signature and date on the plans by the appropriate plan approval agency. The stamp of approval on the plans is solely an acknowledgement of satisfactory compliance with the requirements of these regulations. The approval stamp does not constitute a representation or warranty to the applicant or any other person concerning the safety, appropriateness of effectiveness of any provision, or omission from the stormwater and sediment plan.
- G. When the local conservation district is not the plan approval agency, the conservation district may request to review and comment on stormwater management and sediment control plans. Failure of the conservation district to provide comments by the date specified by the local implementing agency will not delay the approval of the stormwater management and sediment control plans by the implementing agency.
- H. All stormwater management and sediment control plans submitted to the appropriate plan approval agency for approval shall be certified by the designer. The following disciplines may certify and stamp/seal plans as allowed by their respective licensing act and regulations:
 - (1) Registered professional engineers as described in Title 40, Chapter 22.
 - (2) Registered landscape architects as described in Title 40, Chapter 28, Section 10, item (b).
 - (3) Tier B land surveyors as described in Title 40, Chapter 22.

- I. Pursuant to Title 40, Chapter 22, Section 460, stormwater management and sediment control plans may be prepared by employees of the federal government and submitted by the person responsible for the land disturbing activity to the appropriate plan approval agency for approval.
- J. These regulations do not prohibit other disciplines or Certified Professionals, including, but not limited to, Certified Professional Erosion and Sediment Control Specialists, which have appropriate background and experience from taking active roles in the preparation of the plan and design process. All plans and specifications submitted to the appropriate plan approval agency for approval shall be stamped/sealed by those listed in R.72-305H or prepared by employees of the federal government under R.72-305I.
- K. Approved plans remain valid for 5 years from the date of an approval. Extensions or renewals of the plan approvals will be granted by the plan approval agency upon written request by the person responsible for the land disturbing activity.
- L. Approvals of land disturbing activities which were approved prior to the effective date of these regulations shall remain in effect for the original term of the approval. For land disturbing activities which were not initiated during the original term of approval, the person responsible for the land disturbing activity shall resubmit the stormwater management and sediment control plan to the appropriate plan approval agency for review and approval subject to the requirements of these regulations.
- M. Upon receipt of a completed application for sediment and stormwater management, the appropriate plan approval agency shall accomplish its review and have either the approval or review comments transmitted to the applicant within 20 working days. If notice is not given to the applicant or if action is not taken by the end of the 20 working day period, the applicants plan will be considered approved.
- N. One year after the effective date of Chapter 14, Title 48 of the Code of Laws of South Carolina, a federal agency or facility may not undertake a land disturbing activity unless the agency has submitted a stormwater management and sediment control plan for the specific activity to the Commission and the plan has been approved.

In lieu of submitting individual plans for approval, the federal agency or facility may submit an application for a general permit to the Commission for approval.

- O. A local government or special purpose or public service district may request a general permit for its regulated activities from the Commission. If a local government's or special purpose or public service district's request is approved, individual stormwater management and sediment control plans for regulated land disturbing activities will not be required.

72-306. Fees.

- A. The fees associated with the plan review and approval process inspection and enforcement shall be set by the implementing agency. If permit fees are established, they shall be established in accordance with the following items:
- (1) Delegation of program elements will depend, to a large extent, on funding and personnel commitments. If the delegated jurisdiction has a source of funding that is provided through local revenues, then the implementation of the delegated component will not necessitate the imposition of a permit fee to cover the cost of the delegated program component.
 - (2) In the event that one component of an overall stormwater management and sediment control program is not funded through the use of general or special funds, a non-refundable permit fee may be collected at the time that the stormwater management and sediment control plan or application for waiver or variance is submitted or approved. The permit fee will provide for the unfunded costs of plan review, administration and management of the permitting office, construction review, maintenance inspection, and education and training. The plan review or permit approval agency shall be responsible for the collection of the permit fee. Unless all program elements in a county or municipality have been delegated to a single agency, the funds collected not supporting the plan review function shall be distributed to the appropriate agencies.
 - (3) The number of needed personnel and the direct and indirect expenses associated with those personnel shall be developed by the agencies requesting delegation in a specific jurisdiction. Those expenses will then form the basis for determining unit plan approval costs by the local government.
- B. Where the Commission is the implementing agency, the Commission may assess a fee not to exceed \$100.00 per disturbed acre up to a maximum of \$2000.00. No fee will be charged for land disturbing activities which disturb two acres or less. The Commission may also charge a fee not to exceed \$100.00 to review an application for a waiver or variance from the requirements of these regulations. No fee will be charged for extensions or renewal of plan approval unless there are significant changes to the plans.
- C. A maintenance fee may be required on approvals granted for stormwater management structures that will be maintained by a local government.

72-307. Specific Design Criteria, Minimum Standards and Specifications.

- A. General submission requirements for all projects requiring stormwater management and sediment control plan approval will include the following information as applicable:

- (1) A standard application form,
- (2) A vicinity map indicating north arrow, scale, and other information necessary to locate the property or tax parcel,
- (3) A plan at an appropriate scale accompanied by a design report and indicating at least:
 - (a) The location of the land disturbing activity shown on a USGS 7.5 minute topographic map or copy.
 - (b) The existing and proposed topography, overlayed on a current plat showing existing and proposed contours as required by the implementing agency. The plat and topographic map should conform to provisions of Article 4, Regulations 400-490.
 - (c) The proposed grading and earth disturbance including:
 1. Surface area involved; and
 2. Limits of grading including limitation of mass clearing and grading whenever possible.
 - (d) Stormwater management and stormwater drainage computations, including:
 1. Pre- and post-development velocities, peak rates of discharge, and inflow and outflow hydrographs of stormwater runoff at all existing and proposed points of discharge from the site,
 2. Site conditions around points of all surface water discharge including vegetation and method of flow conveyance from the land disturbing activity, and
 3. Design details for structural controls.
 - (e) Erosion and sediment control provisions, including:
 1. Provisions to preserve top soil and limit disturbance;
 2. Details of site grading; and
 3. Design details for structural controls which includes diversions and swales.
- (4) Federal Emergency Management Agency flood maps and federal and State wetland maps, where appropriate.
- (5) The appropriate plan approval agency shall require that plans and design reports be sealed by a qualified design professional that the plans have been designed in accordance with approved sediment and stormwater ordinances and programs, regulations, standards and criteria.
- (6) Additional information necessary for a complete project review may be required by the appropriate plan approval agency as deemed appropriate. This additional information may include items such as public sewers, water lines, septic fields, wells, etc.

B. Specific requirements for the erosion and sediment control portion of the stormwater management and sediment control plan approval process include, but are not limited to, the following items. The appropriate plan approval agency may modify the following items for a specific project or type of project.

- (1) All plans shall include details and descriptions of temporary and permanent erosion and sediment control measures and other protective measures shown on the stormwater and sediment management plan. Procedures in a stormwater and sediment management plan shall provide that all sediment and erosion controls are inspected at least once every seven calendar days and after any storm event of greater than 0.5 inches of precipitation during any 24-hour period.
- (2) Specifications for a sequence of construction operations shall be contained on all plans describing the relationship between the implementation and maintenance of sediment controls, including permanent and temporary stabilization and the various stages or phases of earth disturbance and construction. The specifications for the sequence of construction shall, at a minimum, include the following activities:
 - (a) Clearing and grubbing for those areas necessary for installation of perimeter controls;
 - (b) Installation of sediment basins and traps;
 - (c) Construction of perimeter controls;
 - (d) Remaining clearing and grubbing;
 - (e) Road grading;
 - (f) Grading for the remainder of the site;
 - (g) Utility installation and whether stormdrains will be used or blocked until after completion of construction;
 - (h) Final grading, landscaping, or stabilization; and
 - (i) Removal of sediment controls.

Changes to the sequence of construction operations may be modified by the person conducting the land disturbing activity or their representative and do not constitute a violation unless measures to control stormwater runoff and sediment are not utilized.

- (3) The plans shall contain a description of the predominant soil types on the site, as described by the appropriate soil survey information available through the Commission or the local Conservation District.
- (4) When work in a live waterway is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction.
- (5) Vehicle tracking of sediments from land disturbing activities onto paved public roads carrying significant amounts of traffic (ADT of 25 vehicles/day or greater) shall be minimized.

C. Specific requirements for the permanent stormwater management portion of the stormwater management and sediment control plan approval process include, but are not limited to, the following items. The appropriate plan approval agency may modify the following items for a specific project or type or project.

- (1) It is the overall goal of the Commission to address stormwater management on a watershed basis to provide a cost effective water quantity and water quality solution to the specific watershed problems. These regulations will provide general design requirements that must be adhered to in the absence of Designated Watershed specific criteria.
- (2) All hydrologic computations shall be accomplished using a volume based hydrograph method acceptable to the Commission. The storm duration for computational purposes for this method shall be the 24-hour rainfall event, SCS distribution with a 0.1 hour burst duration time increment. The rational and/or modified rational methods are acceptable for sizing individual culverts or stormdrains that are not part of a pipe network or system and do not have a contributing drainage area greater than 20 AC. The storm duration for computational purposes for this method shall be equal to the time of concentration of the contributing drainage area or a minimum of 0.1 hours, whichever is less.
- (3) Stormwater management requirements for a specific project shall be based on the entire area to be developed, or if phased, the initial submittal shall control that area proposed in the initial phase and establish a procedure and obligation for total site control.
- (4) Water quantity control is an integral component of overall stormwater management. The following design criteria for flow control is established for water quantity control purposes, unless a waiver is granted based on a case-by-case basis:
 - (a) Post-development peak discharge rates shall not exceed pre-development discharge rates for the 2-and 10-year frequency 24-hour duration storm event. Implementing agencies may utilize a less frequent storm event (e.g. 25-year, 24-hour) to address existing or future stormwater quantity or quality problems.
 - (b) Discharge velocities shall be reduced to provide a nonerosive velocity flow from a structure, channel, or other control measure or the velocity of the 10-year, 24-hour storm runoff in the receiving waterway prior to the land disturbing activity, whichever is greater.
 - (c) Watersheds, other than Designated Watersheds, that have well documented water quantity problems may have more stringent, or modified, design criteria determined by the local government that is responsive to the specific needs of that watershed.
- (5) Water quality control is also an integral component of stormwater management. The following design criteria is established for water quality protection unless a waiver or variance is granted on a case-by-case basis.

- (a) When ponds are used for water quality protection, the ponds shall be designed as both quantity and quality control structures. Sediment storage volume shall be calculated considering the clean out and maintenance schedules specified by the designer during the land disturbing activity. Sediment storage volumes may be predicted by the Universal Soil Loss Equation or methods acceptable to the Commission.
 - (b) Stormwater runoff and drain to a single outlet from land disturbing activities which disturb ten acres or more shall be controlled during the land disturbing activity by a sediment basin where sufficient space and other factors allow these controls to be used until the final inspection. The sediment basin shall be designed and constructed to accommodate the anticipated sediment loading from the land-disturbing activity and meet a removal efficiency of 80 percent suspended solids or 0.5 ML/L peak settleable solids concentration, whichever is less. The outfall device or system design shall take into account the total drainage area flowing through the disturbed area to be served by the basin.
 - (c) Other practices may be acceptable to the appropriate plan approval agency if they achieve an equivalent removal efficiency of 80 percent for suspended solids or 0.5 ML/L peak settleable solids concentration, which ever is less. The efficiency shall be calculated for disturbed conditions for the 10-year 24-hour design event.
 - (d) Permanent water quality ponds having a permanent pool shall be designed to store and release the first 1/2 inch of runoff from the site over a 24-hour period. The storage volume shall be designed to accommodate, at least, 1/2 inch of runoff from the entire site.
 - (e) Permanent water quality ponds, not having a permanent pool, shall be designed to release the first inch of runoff from the site over a 24-hour period.
 - (f) Permanent infiltration practices, when used, shall be designed to accept, at a minimum, the first inch of runoff from all impervious areas.
 - (g) For activities in the eight coastal counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Jasper and Horry, additional water quality requirements may be imposed to comply with the S.C. Coastal Council Stormwater Management Guidelines. If conflicting requirements exist for activities in the eight coastal counties, the S.C. Coastal Council guidelines will apply.
- (6) Where ponds are the proposed method of control, the person responsible for the land disturbing activity shall submit to the approving agency, when required, an analysis of the impacts of stormwater flows downstream in the watershed for the 10-and 100-year frequency storm event. The analysis shall include hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications of the proposed land disturbing activity, with and without the pond. The results of the analysis will determine the need to modify the pond design or to

eliminate the pond requirement. Lacking a clearly defined downstream point of constriction, the downstream impacts shall be established, with the concurrence of the implementing agency.

- (7) Where existing wetlands are intended as a component of an overall stormwater management system, the approved stormwater management and sediment control plan shall not be implemented until all necessary federal and state permits have been obtained.
- (8) Designs shall be in accordance with standards developed or approved by the Commission.
- (9) Ease of maintenance must be considered as a site design component. Access to the stormwater management structure must be provided.
- (10) A clear statement of defined maintenance responsibility shall be established during the plan review and approval process.
- (11) Infiltration practices have certain limitations on their use on certain sites. These limitations include the following items:
 - (a) Areas draining to these practices must be stabilized and vegetative filters established prior to runoff entering the system. Infiltration practices shall not be used if a suspended solids filter system does not accompany the practice. If vegetation is the intended filter, there shall be, at least a 20 foot length of vegetative filter prior to stormwater runoff entering the infiltration practice;
 - (b) The bottom of the infiltration practice shall be at least 0.5 feet above the seasonal high water table, whether perched or regional, determined by direct piezometer measurements which can be demonstrated to be representative of the maximum height of the water table on an annual basis during years of normal precipitation, or by the depth in the soil at which mottling first occurs;
 - (c) The infiltration practice shall be designed to completely drain of water within 72 hours;
 - (d) Soils must have adequate permeability to allow water to infiltrate. Infiltration practices are limited to soils having an infiltration rate of least 0.30 inches per hour. Initial consideration will be based on a review of the appropriate soil survey, and the survey may serve as a basis for rejection. On-site soil borings and textural classifications must be accomplished to verify the actual site and seasonal high water table conditions when infiltration is to be utilized;
 - (e) Infiltration practices greater than three feet deep shall be located at least 10 feet from basement walls;
 - (f) Infiltration practices designed to handle runoff from impervious parking areas shall be a minimum of 150 feet from any public or private water supply well;
 - (g) The design of an infiltration practice shall provide an overflow system with measures to provide a non-erosive velocity of flow along its length and at the outfall;
 - (h) The slope of the bottom of the infiltration practice shall not exceed five percent. Also, the practice shall not be installed in fill material as piping along the fill/natural ground interface may cause slope failure;

- (i) An infiltration practice shall not be installed on or atop a slope whose natural angle of incline exceeds 20 percent.
 - (j) Clean outs will be provided at a minimum, every 100 feet along the infiltration practice to allow for access and maintenance.
- (12) A regional approach to stormwater management is an acceptable alternative to site specific requirements and is encouraged.
- D. All stormwater management and sediment control practices shall be designed, constructed and maintained with consideration for the proper control of mosquitoes and other vectors. Practices may include, but are not limited to:
 - (1) The bottom of retention and detention ponds should be graded and have a slope not less than 0.5 percent.
 - (2) There should be no depressions in a normally dry detention facility where water might pocket when the water level is receding.
 - (3) Normally dry detention systems and swales should be designed to drain within three (3) days.
 - (4) An aquatic weed control program should be utilized in permanently wet structures to prevent an overgrowth of vegetation in the pond. Manual harvesting is preferred.
 - (5) Fish may be stocked in permanently wet retention and detention ponds.
 - (6) Normally dry swales and detention pond bottoms should be constructed with a gravel blanket or other measure to minimize the creation of tire ruts during maintenance activities.
- E. A stormwater management and sediment control plan shall be filed for a residential development and the buildings constructed within, regardless of the phasing of construction.
 - (1) In applying the stormwater management and sediment control criteria, in R.72-307, individual lots in a residential subdivision development shall not be considered to be separate land disturbing activities and shall not require individual permits. Instead, the residential subdivision development, as a whole, shall be considered to be a single land disturbing activity. Hydrologic parameters that reflect the ultimate subdivision development shall be used in all engineering calculations.
 - (2) If individual lots or sections in a residential subdivision are being developed by different property owners, all land-disturbing activities related to the residential subdivision shall be covered by the approved stormwater management and sediment control plan for the residential subdivision. Individual lot owners or developers may sign a certificate of compliance that all activities on that lot will be carried out in accordance with the approved stormwater management and sediment control plan for the residential subdivision. Failure to provide this certification will result in owners or developers of individual lots developing a stormwater management and sediment control plan meeting the requirements of R.72-307.

- (3) Residential subdivisions which were approved prior to the effective date of these regulations are exempt from these requirements. Development of new phases of existing subdivisions which were not previously approved shall comply with the provisions of these regulations.
- F. Risk analysis may be used to justify a design storm event other than prescribed or to show that rate and volume control is detrimental to the hydrologic response of the basin and therefore, should not be required for a particular site.
- (1) A complete watershed hydrologic/hydraulic analysis must be done using a complete model/procedure acceptable to the implementing agency. The level of detail of data required is as follows:
 - (a) Watershed designation on the 7.5 minute topo map exploded to a minimum of 1" = 400'.
 - (b) Inclusion of design and performance data to evaluate the effects of any structures which effect discharge. Examples may be ponds or lakes, road crossings acting as attenuation structures and there may be others which must be taken into account.
 - (c) Land use data shall be taken from the most recent aerial photograph and field checked and updated.
 - (d) The water surface profile shall be plotted for the conditions of pre-and post-development for the 10-, and 100-year 24-hour storm.
 - (e) Elevations of any structure potentially damaged by resultant flow shall also be shown.
 - (2) Based on the results of this type of evaluation, the certified plan reviewer representing the implementing agency shall review and evaluate the proposed regulation waiver or change.
- G. The general permit application for use by federal, local governments, or special purpose or public service districts shall contain, as a minimum, standard plans and specifications for stormwater management and erosion and sediment control; methods used to calculate stormwater runoff, soil loss and control method performance; staff assigned to monitor land disturbing activities and procedures to handle complaints for off-site property owners and jurisdictions.

This general permit will be valid for a period of three years and will be subject to the same review criteria by the Commission as that of the delegated program elements.

The use of the general permit classification does not relinquish a land disturbing activity from the requirements of these Regulations. Rather, the general permit precludes that activity from the necessity of a specific plan review for each individual project.

Approval of a general permit does not relieve any agency from the conditions that are part of the general permit approval regarding the implementation of control practices as required by the general permit. Failure to implement control practices pursuant to conditions included in the general permit may result in the revocation of the general permit and the requirement of the submission of individual plans for each activity.

H. The stormwater management and sediment control plan required for land disturbing activities of two (2) acres or less which are not part of a larger common plan of development or sale shall contain the following information, as applicable:

- (1) An anticipated starting and completion date of the various stages of land disturbing activities and the expected date the final stabilization will be completed;
 - (2) A narrative description of the stormwater management and sediment control plan to be used during land disturbing activities;
 - (3) General description of topographic and soil conditions of the tract from the local soil and water conservation district;
 - (4) A general description of adjacent property and a description of existing structures, buildings, and other fixed improvements located on surrounding properties;
 - (5) A sketched plan (engineer's, Tier B surveyor's or landscape architect's seal not required) to accompany the narrative which shall contain:
 - (a) A site location drawing of the proposed project, indicating the location of the proposed project in relation to roadways, jurisdictional boundaries, streams and rivers;
 - (b) The boundary lines of the site on which the work is to be performed;
 - (c) A topographic map of the site if required by the implementing agency;
 - (d) The location of temporary and permanent vegetative and structural stormwater management and sediment control measures.
 - (6) Stormwater management and sediment control plans shall contain certification by the person responsible for the land disturbing activity that the land disturbing activity will be accomplished pursuant to the plan.
 - (7) All stormwater management and sediment control plans shall contain certification by the person responsible for the land disturbing activity of the right of the Commission or implementing agency to conduct on-site inspections.
- The requirements contained above may be indicated on one plan sheet.

I. The stormwater management and sediment control plan for land disturbing activities of greater than two (2) acres but less than five (5) acres which are not part of a larger common plan of development or sale shall contain the following information, as applicable:

- (1) An abbreviated application form;
- (2) A vicinity map sufficient to locate the site and to show the relationship of the site to its general surroundings at a scale of not smaller than one (1) inch to one (1) mile.
- (3) The site drawn to a scale of not smaller than one (1) inch to 200 feet, showing:
 - (a) The boundary lines of the site on which the work is to be performed, including the approximate acreage of the site;
 - (b) Existing contours and proposed contours as required by the implementing agency;
 - (c) Proposed physical improvements on the site, including present development and future utilization if future development is planned;
 - (d) A plan for temporary and permanent vegetative and structural erosion and sediment control measures which specify the erosion and sediment control measures to be used during all phases of the land disturbing activity and a description of their proposed operation;
 - (e) Provisions for stormwater runoff control during the land disturbing activity and during the life of the facility, including a time schedule and sequence of operations indicating the anticipated starting and completion dates of each phase and meeting the following requirements:
 1. Post-development peak discharge rates shall not exceed pre-development discharge rates for the 2- and 10- year frequency 24-hour duration storm event. Implementing agencies may utilize a less frequent storm event (e.g. 25-year, 24- hour) to address existing or future stormwater quantity or quality problems.
 2. Discharge velocities shall be reduced to provide a nonerosive velocity flow from a structure, channel, or other control measure or the velocity of the 10-year, 24- hour storm runoff in the receiving waterway prior to the land disturbing activity, whichever is greater.
 - (f) A complete and adequate grading plan for borrow pits and material processing facilities where applicable, including restoration and revegetation measures;
 - (g) A general description of the predominant soil types on the site;
 - (h) A description of the maintenance program for stormwater management and sediment control facilities including inspection programs.
- (4) All stormwater management and sediment control plans submitted for approval shall contain certification by the person responsible for the land disturbing activity that the land disturbing activity will be accomplished pursuant to the approved plan.
- (5) All stormwater management and sediment control plans shall contain certification by the person responsible for the land disturbing activity of the right of the Commission or implementing agency to conduct on-site inspections.

- (6) All stormwater management and sediment control plans submitted to the appropriate plan approval agency for approval shall be certified by the designer. The following disciplines may certify and stamp/seal plans as allowed by their respective licensing act and regulations:
 - (a) Registered professional engineers as described in Title 40, Chapter 22.
 - (b) Registered landscape architects as describe in Title 40, Chapter 28, Section 10, item (b).
 - (c) Tier B land surveyors as described in Title 40, Chapter 22.
- (7) Pursuant to Title 40, Chapter 22, Section 460, stormwater management and sediment control plans may be prepared by employees of the federal government and submitted by the person responsible for the land disturbing activity to the appropriate plan approval agency for approval.

72-308. Maintenance Requirements and Off-Site Damage Correction.

- A. The Commission will provide technical assistance to local governments who choose to assume the maintenance responsibility for stormwater management structures on, at least, residential lands.
- B. The person responsible for maintenance shall perform or cause to be performed preventive maintenance of all completed stormwater management practices to ensure proper functioning. The responsible inspection agency shall ensure preventive maintenance through inspection of all stormwater management practices.
- C. Inspection reports shall be maintained by the responsible inspection agency on all detention and retention structures and shall include the following items (as applicable):
 - (1) The date of inspection;
 - (2) The name of the inspector;
 - (3) The condition of (if applicable):
 - (a) Vegetation,
 - (b) Fences,
 - (c) Spillways,
 - (d) Embankments,
 - (e) Reservoir area,
 - (f) Outlet channels,
 - (g) Underground drainage,
 - (h) Sediment load, or
 - (i) Other items which could effect the proper function of the structure.
 - (4) Description of needed maintenance.

- D. Responsible inspection agencies shall provide procedures to ensure that deficiencies indicated by inspections are rectified. The procedures shall include the following:
- (1) Notification to the person responsible for maintenance of deficiencies including a time frame for repairs;
 - (2) Subsequent inspection to ensure completion of repairs; and
 - (3) Effective enforcement procedures or procedures to refer projects to the Commission if repairs are not undertaken or are not done properly.
- E. The following criteria shall be used by the appropriate implementing agency in evaluating and for correcting off-site damages resulting from the land disturbing activity:
- (1) Determine the extent of damage by sediment resulting from non-compliance with the approved stormwater management and sediment control plan,
 - (2) Determine the classification of the impaired waterbody, if any,
 - (3) Determine the impact and severity of the damage resulting from non-compliance with the approved stormwater management and sediment control plan,
 - (4) Develop an agreement with landowners for cleanup and corrections, including a schedule of implementation.
 - (5) Evaluate the alternatives for correction of the damage and prevention of future damage, and
 - (6) Failure to implement the agreement in the required schedule will constitute a violation of these regulations.

72-309. Criteria for Designated Watersheds.

The concept of designated watersheds is intended, not only to prevent existing water quantity and water quality problems from getting worse, but also to reduce existing flooding problems and to improve existing water quality or meet State Water Quality Standards through a reduction of the impacts of NPS pollution in selected watersheds. Further, the designation of watersheds under this section may also be used to protect watersheds which do not currently have significant water quality or quantity problems, but which require protection in order to avoid or mitigate the occurrence of future problems which might impair current or protected multiple water uses or important water resources within the watershed. Criteria is established for designated watersheds and these criteria will depend on whether the specific problems of the watershed are water quantity or water quality oriented. Water quantity and water quality concerns will be considered in all designated watersheds, but the overall emphasis for each designated watershed will depend on its existing and future water quality and quantity issues as well as consideration of the multiple offstream and instream water uses within the watershed.

- A. To initiate consideration of a watershed for Designated Watershed status, a watershed shall be recommended by a local government or combinations of local governments through the passage of a local ordinance to the Commission. Upon recommendation to the Commission, the Commission shall publish the request in the State Register and contact all involved agencies at the local and state level within 30 days after receipt of the designation request and their input received prior to any consideration of the designation is made.
- B. Included with the recommendation of a watershed for Designated Watershed status to the Commission shall be an identification of the specific problems that exist in the watershed so that the pursuit of a watershed study is warranted. Designation as a Designated Watershed requires approval by the Commission, the South Carolina Water Resources Commission and the South Carolina Department of Health and Environmental Control. A significant water quantity or water quality problem must exist that would support this designation. Also, inclusion of a watershed as a Designated Watershed will necessitate a public hearing process. The process of designating a watershed shall be based on the following information:
- (1) An estimate of the potential for land disturbing activities to be initiated in the basin which would be regulated under this regulation. This estimate could utilize historical and projected population growth, land use data, and other such appropriate measures to estimate the nonpoint source pollution contribution or stormwater runoff which could be reduced or avoided,
 - (2) An inventory of the offstream and instream water uses in the watershed to quantify and characterize the benefits associated with reducing current or avoiding future water resources problems in the watershed. These could include water supply intakes, State navigable waters, recreational resources, fisheries resources, wetlands, or other such important uses,
 - (3) Water quality data, collected through either the statewide water quality inventory, or other special studies inclusive of benthic macroinvertebrate data,
 - (4) Historical and estimated flood damage and/or estimated flood protection benefits to both private and public property in the watershed,
 - (5) Status of current or description of proposed State and Federal flood protection and flood plain management program(s) and activities in the watershed, and
 - (6) Dangers to public health and welfare.
- C. Following an adequate review of the recommendation, staff of the Commission, South Carolina Water Resources Commission, and the South Carolina Department of Health and Environmental Control shall meet to review and discuss their decision regarding designation. The staff shall prepare a statement in support of, or objection to, the proposed designation within 120 days following receipt of the recommendation by the Commission. The statement shall be voted upon by the appointed commissioners of each respective agency. Ex-officio members of the South Carolina Water Resources Commission representing the Land Resources Conservation Commission and the South

Carolina Department of Health and Environmental Control shall abstain from voting regarding designation at the meeting of the South Carolina Water Resources Commission. Approval by each of the three agencies shall constitute designation.

- D. Upon approval of designation, a Watershed Advisory Committee shall be established to advise and provide guidance in the development and conduct of the watershed master plan. The Commission, South Carolina Water Resources Commission, and the South Carolina Department of Health and Environmental Control will appoint the Watershed Advisory Committee which shall include State, District, local government representatives, and also representatives of the regulated community within the watershed and other persons which may be affected by the plan.
- E. The general components contained in the actual watershed study shall be the following items:
 - (1) Stormwater quantity or water quality problem identification,
 - (2) The overall needs of the watershed including the additional impacts of new land disturbing activities,
 - (3) Alternative approaches to address the existing and future problems,
 - (4) A selected approach that includes the overall costs and benefits,
 - (5) An economic impact analysis of the selected approach,
 - (6) Schedule for implementation,
 - (7) Funding sources that are available for the actual implementation of study recommendations, and
 - (8) A public hearing prior to final Commission, S.C. Water Resources Commission and S.C. Department of Health and Environmental Control approval of the watershed study.
- F. The following goals are to be obtained through the implementation of the Designated Watershed program:
 - (1) Reduction of existing flooding or water quality impacts,
 - (2) Prevention of future flooding or water quality impacts, and
 - (3) Minimization of economic and social losses.
- G. Specific plan components of a watershed study shall include, but not be limited to, the following items:
 - (1) The limits of the watershed.
 - (2) An inventory of existing water quality data.
 - (3) An inventory of areas having significant natural resource value as defined in existing State or local studies as they may be impacted by the construction of location of stormwater control structures.

- (4) An inventory of areas of historical and archaeological value identified in existing State or local studies as they may be impacted by the construction or location of stormwater control structures,
- (5) A map or series of maps of the watershed showing the following information:
 - (a) Watershed topography,
 - (b) Significant geologic formations,
 - (c) Soils information,
 - (d) Existing land use based on existing zoning,
 - (e) Proposed land use based on expected zoning or comprehensive plans,
 - (f) Locations where water quality data were obtained,
 - (g) Locations of existing flooding problems including floor and corner elevations of structures already impacted, and
 - (h) 100-year floodplain delineations, water surface profiles, and storm hydrographs at selected watershed location.
- (6) An inventory of the existing natural and constructed stormwater management system.
- (7) An inventory of historic flood damage sites, including frequency and damage estimates,

72-310. Criteria for Implementation of a Stormwater Utility.

The implementation of a stormwater utility will necessitate the development of a local utility ordinance or special taxing assessment prior to its implementation, pursuant to Chapter 9, Title 4, 1976 Code of Laws as amended by Act 114 1991. There are essential components that an ordinance must contain to function as a funding mechanism for stormwater management and those components shall include, but not be limited to, the following items:

- A. The financing of a stormwater utility with a user charge system must be reasonable and equitable so that each user of the stormwater system pays to the extent to which the user contributes to the need for the stormwater system, and that the charges bear a substantial relationship to the cost of the service. The use of county and municipal taxpayer rolls and accounting systems are allowed for the assessment and collection of fees.
- B. The intent of the utility must be clearly defined regarding program components that are to be funded through the utility. Those components may include but not be limited to the following activities:
 - (1) Preparation of comprehensive watershed master plans for stormwater management,
 - (2) Annual inspections of all stormwater management facilities, both public and private,
 - (3) Undertaking regular maintenance, through contracting or other means, of stormwater management structures that have been accepted for maintenance.

- (4) Plan review and inspection of sediment control and stormwater management plans and practices, and
 - (5) Retrofitting designated watersheds, through contracting or other means, to reduce existing flooding problems or to improve water quality.
- C. The authority for the creation of the stormwater utility and the imposition of charges to finance sediment and stormwater activities is conferred in Chapter 14, Title 48, South Carolina Code. The application of a stormwater utility by means of a local ordinance or other means shall not be deemed a limitation or repeal of any other powers granted by State statute.
- D. The creation of a stormwater utility shall include the following components:
 - (1) The boundaries of the utility, such as watersheds or jurisdictional boundaries as identified by the local governing body,
 - (2) The creation of a management entity,
 - (3) Identification of stormwater problems,
 - (4) Method for determining utility charges,
 - (5) Procedures for investment and reinvestment of funds collected, and
 - (6) An appeals or petition process.
- E. As established by local ordinance or special election or petition, the local government shall have responsibility for implementing all aspects of the utility including long range planning, plan implementation, capital improvements, maintenance of stormwater facilities, determination of charges, billing, and hearing of appeals and petitions. The local government also will have responsibility for providing staff support for utility implementation.
- F. With the respect to new stormwater management facilities constructed by private developers, the local government shall develop criteria for use in determining whether these will be maintained by the utility or by the facility owner. Such criteria may include whether the facility has been designed primarily to serve residential users and whether it has been designed primarily for purposes of stormwater management. In situations where it is determined that public maintenance is not preferable, standards shall be developed to ensure that inspection of facilities occurs annually and that facilities are maintained as needed.
- G. The use of charges is limited to those purposes for which the utility has been established, including but not limited to: planning; acquisition of interests in land including easements; design and construction of facilities; maintenance of the stormwater system; billing and administration; and water quantity and water quality management, including monitoring, surveillance, private maintenance inspection, construction inspection, and other activities which are reasonably required.

72-311. Plan Review and Inspector Certification Programs.

- A. The Commission shall require that local governments which request delegation of stormwater management and sediment control plan review and approval/disapproval shall have a Certified Plan Reviewer representing the implementing agency. Certified Plan Reviewers shall obtain certification from the Commission by successfully completing a Commission sponsored or approved training program. Exceptions to this requirement are limited to Registered Professional Engineers, Registered Landscape Architects and Registered Tier B Land Surveyors who can receive initial certification by demonstrating to the Commission a minimum of three (3) years experience in stormwater management and sediment control planning and design. For a period of one year after the effective date of these regulations, local governments may receive interim certification for plan reviewers during the period before attendance at a Commission sponsored or approved training course by submitting an enrollment form to the Commission. Interim certification shall be valid until the scheduled date of attendance.
- B. The Commission shall require that local governments which request delegation of the construction and maintenance inspection component of the stormwater management and sediment control program shall have a Certified Construction Inspector representing the implementing agency. Certified Construction Inspectors shall obtain certification from the Commission by successfully completing a Commission sponsored or approved training program. For a period of one year after the effective date of these regulations, local governments may receive interim certification for construction inspectors during the period before attendance at a Commission sponsored or approved training course by submitting an enrollment form to the Commission. Interim certification shall be valid until the scheduled date of attendance.
- C. Initial certification as a Certified Plan Reviewer or Certified Construction Inspector is good for a period of five years. Recertification is contingent on attending and successfully completing a Commission sponsored or approved recertification program. This continuing education requirement applies to all Certified Plan Reviewers, including, Registered Engineers, Landscape Architects, Tier B Land Surveyors and Construction Inspectors.

72-312. Review and Enforcement Requirements.

- A. Items listed in this section are activities by the Commission in the event the Commission serves as the implementing agency. When the Commission is requested to assist the implementing agency, these are suggestions the Commission may submit to the implementing agency.

- B. The person responsible for the land disturbing activity shall notify the appropriate inspection agency before initiation of construction and upon project completion when a final inspection will be conducted to ensure compliance with the approved stormwater management and sediment control plan.
- C. The person responsible for the land disturbing activity shall, if required by the implementing agency during the plan approval process, submit “As Built or Record Document” plans. In addition, the person responsible for the land disturbing activity may be required to submit written certification from the professional engineer, landscape architect, or Tier B land surveyor responsible for the field supervision of the land disturbing activity that the land disturbing activity was accomplished according to the approved stormwater management and sediment control plan or approved changes.
- D. The responsible inspection agency shall, for inspection purposes, do all of the following items:
 - (1) Ensure that the approved stormwater management and sediment control plans are on the project site and are complied with;
 - (2) Ensure that every active site is inspected for compliance with the approved plan on a regular basis;
 - (3) Provide the person responsible for the land disturbing activity, a written report after every inspection that describes:
 - (a) The date and location of the site inspection;
 - (b) Whether the approved plan has been properly implemented and maintained;
 - (c) Approved plan or practice deficiencies; and
 - (d) The action taken.
 - (4) Notification of the person responsible for the land disturbing activity in writing when violations are observed, describing the:
 - (a) Nature of the violation;
 - (b) Required corrective action; and
 - (c) Time period for violation correction.
- E. The Commission may investigate complaints or refer any complaint received to the local inspection agency if the activity is located in a jurisdiction that has received delegation of inspections during construction and maintenance inspections. In conjunction with a referral, the Commission may also initiate an on-site investigation after notification of the local inspection agency in order to properly evaluate the complaint. The Commission shall make recommendations on enforcement action when appropriate, and notify the local implementing agency in a timely manner of any recommendations.

- F. The Commission, at its discretion and upon notification to the person responsible for the land disturbing activity may visit any site to determine the adequacy of stormwater management and sediment control practices. In the event that the Commission conducts site inspection, the appropriate inspection agency shall be notified of the inspection. The appropriate inspection agency shall establish a time frame to obtain site compliance. This notification shall, in no way limit the right to the Commission to take action subsequent to any provision of these regulations or Chapter. Formal procedures for interaction between the Commission and the appropriate inspection agency on-site inspection and referral will be developed on an individual basis.
- G. The appropriate plan approval agency may require a revision to the approved plans as necessary due to differing site conditions. The appropriate plan approval agency shall establish guidelines to facilitate the processing of revised plans where field conditions necessitate plan modification. Where changes to the approved plan are necessary those changes shall be in accordance to the following:
 - (1) Major changes to approved stormwater management and sediment control plans, such as the addition or deletion of a sediment basin, shall be submitted by the applicant to the appropriate plan approval agency for review and approval.
 - (2) Minor changes to stormwater management and sediment control plans may be made in the field review report. The appropriate inspection agency shall develop a list of allowable field modifications for use by the construction inspector.
- H. Stormwater management construction shall have inspections accomplished as needed.
- I. The agency responsible for construction inspection may, in addition to local enforcement options, refer a site violation to the Commission for review.
- J. Referral of a site violation to the Commission may initiate a Commission construction inspection of the site to verify site conditions. That construction inspection may result in the following actions:
 - (1) Notification through appropriate means to the person engaged in a land disturbing activity to comply with the approved plan within a specified time frame; and
 - (2) Notification of plan inadequacy, with a time frame for the person engaged in a land disturbing activity to submit a revised sediment and stormwater plan to the appropriate plan approval agency and to receive its approval with respect thereto.

The Commission shall notify the local inspection agency within five working days of what recommendation for enforcement action should be taken on the site.

- K. Failure of the person engaged in the land disturbing activity contractor to comply with Commission requirements may result in the following actions in addition to other penalties as provided in Chapter 14.

- (1) The Commission shall have the power to request the implementing agency to order any person violating any provision of Chapter 14 and these regulations to cease and desist from any site work activity other than those actions necessary to achieve compliance with any administrative order.
 - (2) The Commission may request that the appropriate plan approval agency refrain from issuing any further building or grading permits to the person having outstanding violations until those violations have been remedied.
 - (3) The Commission may recommend fines to be levied by the implementing agency.
- L. If the Commission or the implementing agency utilizes “stop work orders” as a part of its inspection and enforcement program, the following procedure shall be followed:
- (1) The implementing agency may issue a stop work order if it is found that a land disturbing activity is being conducted in violation of this Act or of any regulation adopted or order issued pursuant to this Act, that the violation is knowing and willful, and that either:
 - (a) Off-site sedimentation resulting from non-compliance with the approved stormwater management and sediment control plan has eliminated or severely degraded a use in a lake or natural waterway or that such degradation is imminent.
 - (b) Off-site sedimentation resulting from non-compliance with the approved stormwater management and sediment control plan has caused severe damage to adjacent land.
 - (c) The land disturbing activity which requires an approved plan under these regulations and is being conducted without the required approved plan.
 - (2) The stop work order shall be in writing and shall state what work is to be stopped and what measures are required to abate the violation. The order shall include a statement of the findings made by the implementing agency pursuant to (1) of this section and shall list the conditions under which work that has been stopped by the order may be resumed. The delivery of equipment and materials which does not contribute to the violation may continue while the stop work order is in effect. A copy of this section shall be attached to the order.
 - (3) The stop work order shall be served by the sheriff of the county in which the land disturbing activity is being conducted or by some other person duly authorized by law to serve process, and shall be served on the person at the site of the land disturbing activity who is in operational control of the land disturbing activity. The sheriff or other person duly authorized by law to serve process shall post a copy of the stop work order in a conspicuous place at the site of the land-disturbing activity. The implementing agency shall also deliver a copy of the stop work order to any person that the implementing agency has reason to believe may be responsible for the violation.

- (4) The directives of a stop work order become effective upon service of the order. Thereafter, any person notified of the stop work order who violates any of the directives set out in the order may be assessed a civil penalty as provided in R.72-315. A stop work order issued pursuant to this section may be issued for a period not to exceed three calendar days.
- (5) The implementing agency shall designate an employee to monitor compliance with the stop work order. The name of the employee so designated shall be included in the stop work order. The employee so designated shall rescind the stop work order if all the violations for which the stop work order are issued are corrected, no other violations have occurred, and all measures necessary to abate the violations have been taken. The implementing agency shall rescind a stop work order that is issued in error.
- (6) The issuance of a stop work order shall be a final agency decision subject to judicial review in the same manner as an order in a contested case pursuant to Title 1, Chapter 23, Section 380 of the Code of Laws of South Carolina, 1976. The petition for judicial review shall be filed in the circuit court of the county in which the land-disturbing activity is being conducted.
- (7) The Commission shall file a cause of action to abate the violations which resulted in the issuance of a stop work order within three calendar days of the service of the stop work order. The cause of action shall include a motion for an ex parte temporary restraining order to abate the violation and to effect necessary remedial measures. The resident circuit court judge, or any judge assigned to hear the motion for the temporary restraining order, shall hear and determine the motion within two days of the filing of the complaint. The clerk of circuit court shall accept complaints filed pursuant to this section without the payment of filing fees. Filing fees shall be paid to the clerk of circuit court within 30 days of the filing of the complaint.

72-313. Hearings and Hearings Procedures.

- A. An administrative hearing is available, following a timely request, to determine the propriety of:
 - (1) The denial of delegation of a program component.
 - (2) A revocation of a delegated program component.
 - (3) A denial or revocation of a permit for stormwater management and sediment control.
 - (4) A citizen complaint concerning program operation.
 - (5) The requirements imposed by the implementing agency for approval of the stormwater management and sediment reduction plan.
 - (6) The issuance of a notice of violation or non-compliance with the approved stormwater management and sediment reduction plan.
 - (7) The issuance of fines by an implementing agency.
 - (8) The issuance of a stop work order by an implementing agency.

- B. Requests for administrative hearings and appeals may be made to local governments when program elements are delegated by the Commission or to the Commission when the Commission functions as the implementing agency. In addition, administrative hearings and appeals may be held by the Commission regarding decisions or actions of local implementing agencies. Procedures for acting on appeals and conducting administrative hearings by local implementing agencies will be specified in their request for delegation of program element. The Commission procedures for conducting administrative hearings is specified in R.72-313C through R.72-313Q.
- C. A hearing may be requested by any person. If an adverse action is involved, the hearing may be requested provided that the written request is received within thirty (30) days after the notice is given to the person.
- D. All hearings shall be initiated via correspondence approved by the Commission which shall give notice to all parties of the hearing.
 - (1) All parties must receive notice of the hearing of not less than thirty (30) days;
 - (2) The notice shall be sent by the designated hearing officer(s);
 - (3) The notice shall include:
 - (a) A statement of the time, place, and nature of the hearing;
 - (b) A statement of the legal authority and jurisdiction under which the hearing is to be held;
 - (c) A reference to the particular sections of the statutes and rules involved;
 - (d) A short and plain statement of the matters asserted. If the hearing officer(s) is/are unable to state the matters in detail at the time the notice is served, the initial notice may be limited to a statement of the issues involved. Thereafter, upon application, a more definite and detailed statement shall be furnished.
- E. All hearings shall be conducted by a hearing officer(s) appointed by the Commission.
- F. All hearings shall be conducted in accordance with Section 1-23-10 et seq. of the 1976 South Carolina Code of Laws.
- G. The hearing officer(s) shall issue a proposal for decision which shall be mailed to the parties.
- H. Within twenty (20) days after mailing of the proposal for decision, any party may file exceptions to the hearing officer's proposal for decision.
 - (1) Such exceptions shall be in written form, addressed to the Chairman of the Commission, and served upon all adverse parties;
 - (2) The exceptions shall list all the grounds upon which the exceptions are based.

- I. If no exceptions are received by the Commission within the twenty (20) day period following the mailing of the proposal for decision, the Commission shall issue a final decision.
- J. If timely exceptions are received, the Commission shall send notice to the parties that the appealing party(s) has thirty (30) days to submit a brief. Following the service of the appealing party's brief, or upon the expiration of the thirty (30) day period, whichever shall occur first, the other party shall have thirty (30) days to submit a brief. All briefs must be served on the opposing parties and filed with the Commission.
- K. Following receipt of all briefs, the Commission shall schedule an oral argument if requested to do so by either party.
- L. The request for an oral argument must be in writing, addressed to the Chairman of the Commission, and submitted with that party's brief.
- M. The oral argument shall be scheduled for the next regular Commission meeting following the filing of the last brief.
- N. The oral argument shall be heard by the members of the Commission present at the Commission meeting and shall be held in accordance with the following format:
 - (1) The appealing party shall be given twenty minutes to present his case;
 - (2) The opposing party shall be given twenty minutes to present his case;
 - (3) The appealing party shall be given a rebuttal period of five minutes.
- O. The parties by written stipulation may agree that the hearing officer's decision shall be final and binding upon the parties.
- P. The final order shall be issued by the Commission, and the decision of the Commission shall represent the view of a majority of the Commission members voting on the appeal.
- Q. The final order shall be written and shall comply with the provisions of Section 1-23-10 et. seq. of the 1976 South Carolina Code of Laws.

72-314. Citizen Complaint Procedure on Delegated Program Components and Individual Sites.

- A. Persons may become aggrieved by land disturbing activities and program implementation. The following describes the procedure for a person to complain concerning program operation:
- (1) If the program component in question has been delegated to a local implementing agency, the complaint shall be registered first in writing with that agency. An attempt to resolve the problem shall be made with the local implementing agency.
 - (2) In the event a solution can not be reached, the citizen may forward the complaint to the Commission for review. The Commission shall attempt to resolve the problem with the implementing agency and notify the citizen of the outcome of these efforts.
 - (3) If the Commission determines, based on complaints indicating a continuing pattern, that implementation of delegated program elements falls below the acceptable standards established by these regulations, the Commission may suspend or revoke the delegation in accordance with R.72-304L.
 - (4) All complaints filed with the Commission shall be held for a period of three years and will be considered when delegation renewal is requested by the local government.
- B. Persons may complain about individual site problems or damages. The procedure is as follows:
- (1) The complaint will be registered in writing with the appropriate implementing agency.
 - (2) If the implementing agency is not the Commission and a solution can not be reached with the local implementing agency, the complaint should be filed with the Commission. The Commission will follow procedures listed in R.72-312E.

72-315. Penalties.

- A. Any person who violates any provision of this chapter or any ordinance or regulation promulgated, enacted, adopted, or issued pursuant to this chapter by the Commission or other implementing agency, or who initiates or continues a land disturbing activity for which a stormwater management and sediment control plan is required except in accordance with the terms, conditions, and provisions of an approved plan, is subject to a civil penalty of not more than one thousand dollars. No penalty may be assessed until the person alleged to be in violation has been notified of the violation. Each day of a violation constitutes a separate violation.

- B. The implementing agency shall determine the amount of the civil penalty to be assessed under this section for violations under its jurisdiction. It shall make written demand for payment upon the person responsible for the violation and set forth in detail the violation for which the penalty has been invoked. If payment is not received or equitable settlement reached within thirty days after demand for payment is made, a civil action may be filed in the circuit court in the county in which the violation is alleged to have occurred to recover the amount of the penalty. If the implementing agency is the commission, the action must be brought in the name of the State. Local governments shall refer the matters under their jurisdiction to their respective attorneys for the institution of a civil action in the name of the local government in the circuit court in the county in which the violation is alleged to have occurred for recovery of the penalty.

72-316. Severability.

If any section, subsection, sentence, clause, phrase, or portion of these regulations are for any reason held invalid or unconstitutional by any court or competent jurisdiction, such provision and such holding shall not affect the validity of the remaining portions of these regulations.

Appendix DD – Fort Jackson Land Disturbance Handbook

FORT JACKSON

LAND DISTURBANCE HANDBOOK



FIRST EDITION
JULY 2004

Prepared for Fort Jackson Directorate of Logistics and Engineering – Environmental and Natural Resources Division (DLE-ENRD) in accordance with South Carolina Regulations and the USEPA NPDES Stormwater Program

Prepared by:



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ACRONYMS

BMP	Best Management Practices
BSDP	Best Site Design Practices
CWA	Clean Water Act
ECB	Erosion Control Blankets
EPSC	Erosion Prevention and
FEMA	Federal Emergency management Agency
LID	Low Impact Development
MEP	Maximum Extent Possible
MOI	Memorandum of Instruction
MS4	Municipal Separate Storm Sewer System
NOI	Notice of Intent
NOW	Notice of Work
NPDES	National Pollutant Discharge Elimination System
PCA	Pollution Control Act (South Carolina 1970)
SCDHEC	South Carolina Department of Health and Environmental Control
SMSRA	Storm Water Management and Sediment Reduction Act (South Carolina 1991)
SPP	Spill Prevention Plan
SWMP	Storm Water Management Plan
TRM	Turf Reinforced Mat
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

EXECUTIVE SUMMARY

Purpose

The purpose of the handbook is to educate potential engineers, architects, contractors and any others in the manner in which land development activities will be conducted. The main focus of the handbook is the proper control of runoff in terms of quantity and quality. Details of the submittal and permitting process are also provided.

Need for the Handbook

The handbook will provide consistency in plan submittals that are part of any land disturbance activity as well as address some of the issue that Fort Jackson faces under the NPDES General Permit SCS0000000 requirements. Fort Jackson has obtained the equivalent of delegated review responsibilities from SCDHEC for land disturbance activities, and this handbook will assist reviewers and planners for Fort Jackson with the design that will simplify the process for complying with the NPDES permit and ensuring the protection of lands.

Organization

This handbook is sectioned into the following chapters:

Chapter 1 – Introduction: Covers the broad perspective on why and how this handbook was created. Details on the history of the NPDES program and compliance issues are discussed.

Chapter 2 – Storm Water Management Requirement and Standards: Lists all of the requirements that are to be in any submittal package for land disturbance activities.

Chapter 3 – Plan Submittal and Design Requirements: Provides the submittal process and the types of information that Fort Jackson requires in any submittal package for land disturbance activities. These include design specifics for storm sewer, erosion control, BMPs, culverts, detention ponds, or other structural portions of the drainage system.

Chapter 4 – References: Lists all references used or mentioned in the handbook. These include documents that provide greater detail on methodologies, the NPDES program, BMPs design, and many others.

Limitations

This handbook was not intended to be a single source document for performing the required civil engineering calculations that will be necessary to comply with the land disturbance requirements of Fort

Jackson. Instead, the information will provide many of the inputs required for those calculations. The reason for this approach was to simplify the process. For example, including information on how to calculate a peak flow, which is fully documented and available, is redundant and inefficient. The Reference section provides links to this and many other types of information.

1.0 INTRODUCTION

1.1 Purpose of the Handbook

The purpose of the Fort Jackson Land Disturbance Handbook is to provide engineers, plan reviewers, inspectors, and contractors involved in land development within the boundaries of the United States Army Basic Training Facility at Fort Jackson with the following information:

- Land disturbance requirements;
- Storm water management requirements;
- Summarization of the permit application submittal requirements and approval process; and
- Guidelines for designing, implementing, and maintaining storm water best management practices (BMPs) and low-impact development (LID) techniques to
- improve water quality, prevent illicit discharges, and minimize storm water runoff impacts due to increased flow volumes and peak discharge rates from developed areas.

This Handbook has been prepared in accordance with NPDES Phase II General Permit No. SCS00000000 and the South Carolina Storm Water Management and Sediment Reduction Act to accomplish the following objectives:

- Reduce storm water impacts on water quality;
- Reduce storm water impacts on water quantity;
- Protect downstream areas from adverse storm water impacts resulting from development;
- Identification of required content for and format of storm water plan submittals and plan reviews; and
- Submittal of high quality storm water design plans from the design community.

This Handbook has been prepared under the direction of Fort Jackson, which has been granted the authority to administer the stormwater management and sediment control plan review, approval/disapproval, and inspection by South Carolina Department of Health and Environmental Control (SCDHEC). By satisfying the requirements outlined in this Handbook, the resulting design is considered to be in compliance with the provisions of the Stormwater Management and Sediment Reduction Act of 1991.

1.2 Description and Use of the Handbook

The Handbook was developed under the assumption that the user possesses a basic understanding of storm water control design, construction, or land development depending on the users particular area of expertise. The Handbook provides those groups and others with required information for and proper formatting of submittal packages on proposed land disturbance activities on Fort Jackson. Users of this Handbook who are not justly qualified by education or experience in the fields of storm water control design, construction, or land development should consult with a qualified professional in one or more of these areas prior to planning for land disturbance activities.

This Handbook is not intended to be a systematic design methodology that addresses every land development situation that may occur on Fort Jackson nor is it a detailed reference for the various methods and procedures used in the design process. The application of engineering principles and judgement combined with the information contained within this and other referenced material are necessary to successfully complete the planning, design, and preparation of documents for storm water management plan submittal. References to guidance documents from federal, state, and local agencies are given throughout the Handbook to provide additional information to users.

This Handbook is not intended to restrain or inhibit engineering creativity, freedom of design, or the need for engineering judgement. When shown to be applicable, it is encouraged that new procedures, techniques, and innovative storm water BMPs be submitted with supporting documentation. However the use of such approaches should be substantiated with submitted documentation by design professionals showing that proposed design is equal to, or exceed the traditional procedures in terms of performance and economic feasibility.

1.3 Design Handbook Organization

The Handbook contains four chapters. A general Table of Contents is found at the beginning of the Handbook. This Handbook is organized to present recommended technical and engineering procedures along with the criteria needed to comply with the State of South Carolina's Storm Water Management and Sediment Reduction Act and NPDES Permit No. SCS000000. Each chapter of the Handbook presents information on each aspect of storm water management that could be encountered during land disturbance activities.

1.4 Updates to the Design Handbook

This Handbook is intended to be a dynamic document. As design technology and criteria evolve, the Handbook will be updated.

1.5 The Need for Storm Water Management

Development has the potential to alter the natural drainage patterns and flow rates and volumes of water in the environment. Development changes the physical, chemical, and biological conditions of natural waterways. When land is developed, the natural hydrology of the

watershed is disrupted and traditional systems have facilitated the efficient removal of not just runoff, but associated pollutants into receiving waters. Clearing removes vegetation that intercepts and slows rainfall runoff. Grading removes beneficial topsoil, compacts the subsoil, and fills in depressions that provide natural underground storage. As a result of land development, infiltration is decreased and rainfall that once seeped into the ground runs off the surface at an accelerated rate.

1.5.1 Effects of Development on Watershed Hydrology

Development and urbanization have the following impacts on receiving waterbodies:

- Changes to Stream Flow
 - Increased runoff volumes
 - Increased peak runoff discharges
 - Greater runoff velocities
 - Increased flooding frequency
 - Lower dry weather flows (base flow)
- Changes to Stream Geometry
 - Stream channel enlargement and erosion
 - Stream downcutting
 - Changes in channel bed due to sedimentation
 - Increase in floodplain elevation
- Degradation of Aquatic Habitat
 - Degradation of habitat structure
 - Decline in stream biological functions
- Water Quality Impacts
 - Reduced oxygen in streams
 - Microbial contamination
 - Hydrocarbons and toxic materials
 - Sedimentation
- Property Damage and Safety Concerns
- Unsightly Aesthetic Stream Channel Conditions

1.5.2 Innovative Design Approach

When designing for land disturbance activities, the design should consist of five categories: maximum water quantity (flood control), design storm rainfall depth and/or intensity (design conditions), erosion prevention, sediment control, and water quality benefits. If an innovative storm water design approach is to be used, the design professional should take the following considerations in mind:

- Storm water quantity and quality are best controlled at the source of the problem by reducing the potential maximum amount of runoff and pollutants; and
- Best site design techniques implement storm water management by using simple, nonstructural methods along with or in place of traditional storm water management structures when applicable.
- Equaling or exceeding traditional stormwater management designs in terms of performance (rate/volume attenuation, pollutant removal) and economic feasibility (long-term) are essential to a proposed concept's eventual approval.

Innovative approaches to site design are more of a source control for storm water runoff – the site design practices limit the amount of runoff generated as well as use certain BMPs within the design. These types of design concepts are described in detail in several sources including: **Georgia Storm Water Handbook, Volume 1: Policy Guidebook**, First Edition, Atlanta Regional Commission, August 2001; and, **Low-Impact Development Design Handbook**, Prince George's County Maryland (1999a, 1999b). Some general concepts from these sources are provided in the following Sections.

1.5.3 Best Site Design Practices and Site Planning Process

The first step in addressing storm water management begins in the site planning and design stage of the development project. By implementing Best Site Design Practices (BSDPs) during the site planning process, the amount of runoff and pollutants generated from a site can be reduced by minimizing the amount of impervious area and utilizing natural on-site treatments. The minimizing of adverse storm water runoff impacts by the use of BSDPs and site planning should be a major consideration for a design professional.

The reduction of runoff volumes and storm water pollutants reduces the total number and size of storm water management controls that must be implemented under the guidelines set forth in this Handbook. BSDPs reduce the amount of total post-development impervious areas and maintains natural characteristics of the pre-development site conditions. Therefore, the post-development curve number and time of concentrations are maintained more closely to the pre-development conditions. This reduces the overall hydrologic and hydraulic impact of the development.

1.5.3.1 Maintaining site resources and natural undisturbed areas

Conservation of site resources and natural undisturbed areas helps to reduce the post development runoff volume and provide areas for natural storm water management. Some natural site resources that should be maintained include, but are not limited to:

- Natural drainageways,
- Vegetated buffer areas along natural waterways,
- Floodplains,
- Areas of undisturbed vegetation,
- Low areas within the site terrain,
- Natural forested infiltration areas, and
- Wetlands.

1.5.3.2 Lower impact site layout techniques

Lower impact site layout techniques involve identifying and analyzing the location and configuration of structures on the site to be developed. Where applicable, the following options that create lower impacts layouts should be used:

- Fit the design layout to follow the natural contours of the site to minimize clearing and grading and preserve natural drainage ways and patterns.
- Limit the amount of clearing and grading by identifying the smallest possible area on the site that would require land disturbance.
- Place development areas on the least sensitive areas of the site.
- Utilize nontraditional designs to reduce the overall imperviousness of the site by providing more undisturbed open space by minimizing clear-cutting.

1.5.3.3 Reduction of impervious cover

The reduction of total impervious area directly relates to a reduction in storm water runoff volume and the associated pollutants from a development site. The amount of impervious cover on a site can be reduced by the following techniques where applicable:

- Reduce building footprints by requiring some buildings to be multi-story.
- Reduce parking lot areas and/or the use of porous paver surfaces for desired overflow parking.

- Increase the amount of vegetated parking lot “islands” that can also be utilized for storm water management practices such as Bioretention areas.

1.5.3.4 Utilization of natural features for storm water management

Traditional storm water drainage design does not utilize the natural drainage patterns of the site from the pre-developed state. Structural storm water drainage controls are traditionally designed to quickly remove storm water runoff from the site without utilizing any of the natural storage areas. These natural drainage areas should be considered as potential storm water drainage systems. These natural areas can be utilized in the following ways where applicable:

- Vegetated buffers and undisturbed areas on the site are useful to control sheet flow (not concentrated flows) by providing infiltration, runoff velocity reduction, and pollutant removal.
- Various natural drainageways should be maintained and not disturbed to provide a natural storm water drainage system to carry runoff to a natural outlet. The use of natural drainageways allows for more storage of storm water runoff, lower peak flow rates, a reduction in erosive runoff velocities, and the capture and treatment of pollutants.
- Use vegetated swales instead of curb and gutter applications where applicable. This application allows for more storage of storm water runoff, lower peak flow rates, a reduction in erosive runoff velocities, and the capture and treatment of pollutants which does not occur with curb and gutter systems.
- Where ditched roadways are not practicable, curb and gutter systems may be combined with vegetated swales at outfalls to provide added water quality benefits versus the traditional piped outfall designs.
- When applicable, direct rooftop runoff to pervious natural areas for water quality treatment and infiltration instead of connecting rooftop drains to roadways and other structural storm water conveyance systems.

1.5.3.5 Engineered/proprietary devices

Fort Jackson is aware of the potential benefit in using a number of engineered devices currently available on the market, such as treatment devices such as baffle boxes, cartridge filters, bioretention, erosion control devices such as socks and tubes, and advanced vegetation producing methodologies. Fort Jackson will evaluate any and all such devices specified for a given product and require for each appropriate drawings, specifications, and discussions as to the applicability of the product, expected performance, and required maintenance. Fort Jackson reserves the right to request that certain devices be installed.

1.6 Storm Water Management Regulations and Policies

To address the adverse impacts of urbanization and land development, Federal, State and Local regulations have been adopted to protect the quantity and quality of the runoff received by the natural receiving waterbodies.

1.6.1 Storm Water Related Regulations and Permits

With the mandate of the Clean Water Act, the United States Environmental Protection Agency (USEPA) stated that it is illegal to discharge any pollutant to the “Waters of the United States” without a NPDES Permit. The various types of NPDES storm water permits are described below.

1.6.1.1 Clean Water Act

The Federal Clean Water Act (CWA) requires that discharge permits, called National Discharge Elimination System (NPDES) permits, be obtained for every point source discharge of wastewater. The 1987 amendments to the CWA also required NPDES permits for industrial discharges, including storm water runoff associated with land disturbing activity (typically land development and construction) of five (5) acres or greater. The threshold five-acre area was challenged and the federal NPDES regulations were amended in accordance with a court order for storm water discharges in December 1999. These amendments lower the acreage for when an NPDES permit is required for construction or land clearing to one (1) acre while allowing a case-by-case determination for sites less than one (1) acre.

The 1987 CWA Amendments also require NPDES permitting for storm water runoff from urbanized areas. A municipal separate storm sewer system (MS4) NPDES permit is required based on population. MS4s are divided into three categories: large (250,000 or greater); medium (less than 250,000 but equal to or greater than 100,000); and small (greater than 50,000). The implementation schedule for these MS4 permits has been repeatedly delayed. All permits are now in the process of being implemented.

For both the land disturbing and MS4 non-point source permits, preventing the pollution at the source through the use of Best Management Practices (BMPs) is the preferred and most practical method. Additional BMPs can be used as needed to address capture, control, and treatment of pollutants after they have been generated or released from a source area. Authority to administer the NPDES permit program was delegated to SCDHEC in accordance with the CWA by the USEPA.

1.6.1.2 South Carolina Pollution Control Act

The South Carolina Pollution Control Act (PCA) S.C. was originally enacted in 1950 and was last amended in 1970 during the initial stages of the environmental movement. It was written very broadly and is applicable to essentially any activity.

The most important provision of the statute is Section 48-1-90, it states that it is “unlawful for any person, directly or indirectly, to throw, drain, run, allow to seep or otherwise discharge into the environment...[any] wastes, except as in compliance with a permit” issued by SCDHEC.

1.6.1.3 South Carolina Storm Water Management and Sediment Reduction Act

The South Carolina Storm Water Management and Sediment Reduction Act of 1991 (SMSRA) S.C. Code Ann. §§ 48-14-10 et seq. was enacted to address the increase in storm water runoff rate and quantity, the decrease of rainwater infiltration, and the increase in erosion associated with the extensive urban development that has been occurring throughout the state. Fort Jackson has the authority to implement the requirements of this Act and its associated regulations.

1.6.1.4 NPDES Permit for Storm Water Discharges Associated with Industrial Activity

All storm water runoff from “industrial activities” is considered an illegal discharge without an NPDES Storm Water Permit (SCR100000). These permits require certain industries to develop and implement a Storm Water Pollution Prevention Plan (SWPPP), which must include appropriate BMPs to minimize pollution to the receiving natural waterbodies. There are two general types of industrial activity permits: “construction related” and “other”. A NPDES storm water permit for storm water discharges from construction sites is required for all construction sites that disturb one (1) or more acres of land. The requirements for obtaining and complying with this type of permit are covered within this Handbook.

1.6.1.5 NPDES General Permit SCS0000000

Fort Jackson is required to comply with the NPDES General Permit for storm water discharges. This permit was issued by SCDHEC in accordance with the provisions of the Stormwater Management and Sediment Reduction Act of South Carolina (S.C. Code Sections 48-14-10 et seq., 1976) and with the United States Clean Water Act (P.L. 92-500), as amended, 33 U.S.C. Section 1251 et seq. The Memorandum of Instruction (MOI) defines compliance of this permit. The permit requires that Fort Jackson develop and implement a Storm Water Management Program (SWMP) to control the discharge of pollutants from its MS4 to the maximum extent practicable (MEP).

Fort Jackson has been granted the authority to administer the stormwater management and sediment control plan review and approval/disapproval, and the inspections during construction and maintenance inspection components of the South Carolina Stormwater Management and Sediment Reduction Program to handle the following responsibilities:

- Comply with all Federal and State regulatory requirements imposed by the NPDES Permit in accordance with the Clean Water Act to manage storm water discharges from Fort Jackson.
- Conduct all activities necessary to carry out the storm water management programs and other requirements included in the NPDES General Permit, SCS0000000.

- Maintain the storm water system consistent with provisions of NPDES General Permit, and pursue the necessary means and resources required to fulfilling this responsibility.
- Direct and oversee the continuous implementation and direct and ensure compliance with the NPDES General Permit.

As of July 1st, 2004, the NPDES General Permit SCS00000000 is in litigation within the State courts of South Carolina. Fort Jackson has continued the process of complying with this permit in a timely and necessary manner.

A copy of the MOI can be found in Appendix A.

1.7 Contact Information

The following Fort Jackson personnel should be contacted for any questions, clarifications, or other information not in this handbook.

Primary Contact:

Doyle Allen
Soil Conservationist
ATZJ-DLE-PSW
Fort Jackson, SC
(803) 751-7232
(803) 751-6821 (fax)
allend@Jackson.army.mil

2.0 STORM WATER MANAGEMENT REQUIREMENTS

2.1 Overview

This chapter presents a set of minimum requirements and standards for storm water management for development within the boundaries of Fort Jackson, South Carolina. The purpose of the minimum requirements and standards is to reduce the impact of storm water runoff on receiving waterbodies downstream from land development. The goal of this chapter is to address both water quantity and water quality requirements and standards associated with storm water runoff from land development. The requirements discussed in this chapter are based on the South Carolina Department of Health and Environmental Control (SCDHEC) and Federal storm water regulations discussed in the previous chapter. Consistency with Richland County and the SC Department of Transportation stormwater system designs was established in the development of these requirements.

2.2 Minimum Requirements for Development

2.2.1 Applicability

Storm water management minimum requirements and standards apply to all land disturbance within Fort Jackson that consists of one or more of the following:

- All development that involves the disturbance of one (1) acre of land or greater;
- Redevelopment that involves the disturbance of one (1) acre of land or greater;
- Any commercial or industrial development that falls under the NPDES Industrial Storm Water Permit; and,
- Development that creates a peak flow increase of greater than one cubic foot per second (1 cfs).

As a general requirement for submittal purposes, all land disturbance activities that fall under these provisions shall require the following as necessary:

- Completed Fort Jackson Application Form for Land Disturbing Activities,
- Completed Fort Jackson Land Disturbance Submittal Summary Form.
- Construction drawings, and
- Technical Report.

2.2.1.1 Fort Jackson Application Form for Land Disturbing Activities

The Application Form shall be completed and contain certification by the person responsible for the land disturbing activity that their actions will be accomplished pursuant to the approved plan and that responsible personnel will be assigned to the project. A copy of the application form can be found in Appendix B.

2.2.1.2 Fort Jackson Land Disturbance Submittal Summary Form

This sheet allows submitters to enter all information from the technical report in a summarized format that will aid reviewers from Fort Jackson by providing a comprehensive glance at the land disturbance activities and associated storm water management plan that is being proposed. All information inserted into this form should be substantiated with detailed calculations, which are to be placed in the Technical Report section.

This form contains sections corresponding to hydrology, hydraulics, storm sewer design, BMP design, including detention ponds, erosion control design, and maintenance schedules. A blank form is given in Appendix C.

2.2.1.3 Technical Report

The technical report contains all of the engineering details of the proposed development project in an understandable, legible document. Failure to provide all the information required in this section may result in the denial of receiving approval from Fort Jackson and coverage under the General Permit. The items listed as the technical report submission requirements shall be used as a checklist to verify that all required items are properly submitted.

Possible sections of the technical report include, but are not limited to:

- Watershed information,
- Hydrologic information,
- Storm sewer design information,
- Channel design information,
- Erosion Prevention and Sediment Control (EPSC) plans design information,
- Detention/Retention facilities design information,
- Water quality/BMPs design information,
- Outlet velocities, and
- Maintenance schedules.

The details of requirements for each of these topics are provided in the following chapters

2.2.2 Exemptions

The following development activities within the fort shall be exempt from the minimum regulations and standards:

- Development that does not disturb more than one (1) acre of land.
- Development that does not create a peak flow increase of greater than one (1) cfs.

- Land disturbing activities on agricultural land for production of plants and animals useful to man.
- The construction of agricultural structures of one or more acres, such as broiler houses, machine sheds, repair shops and other major buildings which require the issuance of a building permit shall require the submittal and approval of a Storm Water Management Plan.
- Customary and routine grounds maintenance, landscaping, and home gardening which does not require a zoning use exception or building permit, and does not affect storm water drainage entering or leaving any public right-of-ways.
- Land disturbance activities undertaken on forest land for the production and harvesting of timber and timber products.
- Land disturbing activities that are conducted under another State or Federal environmental permitting, licensing, or certification program where the State or Federal environmental permit, license, or certification is conditioned on compliance with the minimum standards and criteria developed under this Handbook.
- Any land disturbing activities undertaken by any entity that provides gas, electrification, or communication services, subject to the jurisdiction of the South Carolina Public Service Commission.
- Emergency repairs of a temporary nature that are necessary for the preservation of life, health, or property and are made under circumstances where it would be impracticable to obtain a Storm Water Management Permit.

2.2.3 Spill Prevention Plans

A spill prevention plan (SPP) may be required depending on the specifics of the project and the discretion of Fort Jackson personnel. The submittal requirements for SPPs will be issued as necessary. US EPA provides information on SPPs on the Office of Wastewater Management website (www.epa.gov/owm).

3.0 PLAN SUBMITTAL AND DESIGN REQUIREMENTS

This chapter provides the user with the information requested by the Fort Jackson concerning land disturbance activities. A discussion of the recommended storm water management planning process is followed by the details of the Storm Water Management Planning, the submittal, review and approval processes, design standards, technical requirements, and contractor-related requirements.

3.1 Storm Water Management Planning

3.1.1 Purpose

The purpose of Storm Water Management Planning is to ensure that storm water management is considered and fully integrated at the planning stages of the site-development process. This involves a more comprehensive approach to site planning and a thorough understanding of the physical characteristics and resources associated with the project site. Site designers are encouraged to develop comprehensive Storm Water Management Plans (SWMP) for proposed development. This planning includes addressing each of the following categories separately:

- Storm water quantity controls,
- Erosion and sediment control,
- Storm water quality controls, and
- Storm water conveyance controls.

The result of this planning is a comprehensive report that contains technical information and analysis to submit to the Fort Jackson to determine if the proposed development meets the storm water regulations and the standards of the State of South Carolina and the United States Government. Details of state laws concerning storm water were discussed in section 1.6.

3.1.2 Steps for Successful Storm Water Management Plans

The design of successful storm water management plans involves adhering to the following requirements where applicable:

- Pre-submittal site meeting,
- Review of site development requirements,
- Detailed site analysis,
- Creation of a Storm Water Concept Plan, and
- Design aspects of the SWMP,

- Approval and completion of the SWMP → Final SWMP.

3.1.2.1 Pre-submittal site meeting

One of the more important actions that can take place at the beginning of the land-development process is a pre-submittal meeting between Fort Jackson, design professional, and contractor. This meeting may take place at the actual site to be developed. This meeting allows all of the entities involved in the land development process to understand the storm water management requirements and identify the areas on the site that will require the most attention to meet the requirements of the regulations. Major incentives for the pre-submittal site meeting are establishing a partnership between all of the entities involved through the entire development process, and increasing the chances of expedited approval through an early understanding of the permitting and plan requirements. It shall be left to the discretion of Fort Jackson if this meeting shall or shall not be required for a specific project.

3.1.2.2 Review of site development requirements

The SWMP design professional should be familiar with the South Carolina storm water management requirements (see section 1.6). All other information and guidance can be obtained from this Handbook and the pre-submittal meeting.

The plan design professional must also be familiar with other local requirements and ordinances such as, but not limited to the following:

- Road and utility requirements,
- Land development regulations,
- Floodplain management ordinances, and
- Other Local, State, and Federal regulatory requirements and regulations.

3.1.2.3 Detailed site analysis

To better understand the existing topography, hydrology, and hydraulics of the proposed development, the design professional should personally make a field site visit. During this visit, the design professional should collect as much information as necessary to create an accurate existing condition map of the proposed site. An understanding of the existing site conditions should result in the implementation of a SWMP that will effectively control stormwater runoff quantity and quality from land disturbance impacts. An actual site visit also gives the design professional an initial vision of how the potential storm water management system can fit with the surroundings and project expectations.

Items to be recorded during the site visit shall include, but are not be limited to the following:

- Topography of the site especially very steep sloped areas,
- Natural drainage patterns, swales, and detention areas,

- Natural perennial flowing streams and intermittent streams,
- Existing floodplain locations and elevations,
- Soil types and evidence of eroded and/or non-eroded soils,
- Existing vegetation including the corresponding density of each type of vegetation, including:
 - trees,
 - grasslands, and
 - various ground covers,
- Existing development including roads, buildings, utility easements, parking areas, and ponds,
- Existing storm water facilities including ditches, storm sewer systems, and detention ponds,
- Adjacent property characteristics and storm water outfall points,
- Wetlands,
- Critical habitat areas,
- Boundaries of existing wooded areas, and
- Existing buffer areas along natural drainageways and channels.

3.1.2.4 Creation of a Storm Water Concept Plan

The Storm Water Concept Plan involves the overall layout of the site including the storm water management system layout. This Concept Plan gives the design professional the opportunity to propose several potential site layout possibilities to Fort Jackson. The submittal of this plan is the first step in obtaining approval from Fort Jackson.

The following steps should be followed when developing the Storm Water Concept Plan:

- Based on the review of the existing site conditions, use the appropriate best site design approaches. This will minimize the size and number of water quantity and water quality controls needed to comply with the State and Federal storm water management requirements;
- Discuss all modeling methodologies to be used;
- Calculate the preliminary water quantity and water quality control volumes to comply with the NPDES General Permit requirements;

- Perform preliminary selections and potential locations of all water quantity and water quality controls including storm water conveyance systems and erosion and sediment control structures;
- Determine an estimate of all costs for construction and engineering.

It is very important that a Storm Water Concept Plan is integrated into the overall site design process and is not the last topic covered before submittal of the permit package. If necessary, the application of a Concept Plan should expedite the final design process and review process to obtain land disturbance and, if necessary, NPDES permits.

To achieve maximum benefits, the Storm Water Concept Plan should include at a minimum the following elements when applicable:

- Site location and description of the site,
- Narrative description of existing and proposed drainage patterns and facilities,
- Vicinity map of the project location,
- Existing conditions and proposed development plan having at least the following items:
 - existing and proposed contours,
 - perennial and intermittent streams,
 - predominant soil types and their locations from USDA soils maps or soil samples (a soil map of Fort Jackson is provided in Appendix E),
 - watershed delineation maps,
 - existing vegetation boundaries and proposed clearing limits,
 - location of all existing natural features such as wetlands, ponds, lakes, floodplains, and stream buffers,
 - location of existing and proposed roads, buildings, parking areas and other impervious surfaces,
 - location of existing and proposed utilities,
 - preliminary estimates of required water quantity management storage volumes and water quality management storage volumes,
 - preliminary selection and location of all storm water management control facilities including erosion and sediment control structures,

- location of existing and proposed conveyance systems such as grass channels, swales, and storm sewer systems,
- preliminary location and dimensions of all culvert and bridge crossings,
- Preliminary waiver or variance requests if applicable,
- Maintenance schedule for all proposed storm water control structures.
- Fort Jackson/military specific considerations

Upon submittal of the Concept Plan by Fort Jackson, the applicant shall create and submit a SWMP along with other portions of the submittal package, which are discussed in the following sections.

3.1.2.5 Creation of a SWMP

The SWMP should be prepared upon receiving acceptance of the Storm Water Concept Plan. This shall consist of maps, narratives, and supporting design calculations for the proposed storm water system and should include the following sections when applicable:

- Pre-development hydrologic analysis and calculations that determine the existing storm water runoff volumes, peak flow rates and flow velocities,
- Post-development hydrologic analysis and calculations that determine the storm water runoff volumes, peak flow rates and flow velocities,
- Storm water management control facility design:
 - narrative describing the storm water management control facilities selected and methodologies to be used in their design,
 - location of all storm water management control facilities,
 - supporting calculations that justify that the facilities meet Fort Jackson and NPDES General Permit requirements, including but not limited to: hydrographs, stage storage volumes, stage-discharge values for water quantity and water quality control facilities and design calculations and elevations for all storm water conveyance systems,
 - a permanent maintenance plan for each permanent storm water management facility,
- Erosion and sediment control plan,
 - narrative describing the erosion and sediment control facilities selected,
 - location of all erosion and sediment control facilities,

- resulting design calculations and trapping efficiencies for all sediment control facilities,
- Downstream analysis calculations showing the effect of post-development design flows on downstream storm water conveyance systems and channels
- Water quality control plan
 - details on all water quality ponds and/or structures and strategy for controlling first segment of runoff.

More details of all elements that should be in the SWMP are provided in the later sections of this Handbook. A complete SWMP will be submitted to Fort Jackson for review and approval before initiating any construction activities on the proposed development site. Fort Jackson reserves the right to reject a SWMP and request a revision to address any deficiencies. If approved, the plan then becomes the Final SWMP.

3.1.2.6 Completion of the SWMP

If necessary, the revised SWMP shall reflect any changes or modifications requested or required by Fort Jackson and add further detail to the previously submitted plan. The improved version of the SWMP shall be resubmitted to Fort Jackson. Upon approval, this plan shall become the Final Storm Water Management Plan. Approval from Fort Jackson shall be required prior to initiating any construction activities on the proposed development site. Fort Jackson reserves the right to deny approval until the SWMP meets the requirements defined in this Handbook.

Once the Final SWMP is in place, Fort Jackson can issue the approval of land disturbance activities.

3.2 Submittal Requirements for Sites with Less than One Disturbed Acre

The person or entity responsible for any land disturbing activity that disturbs less than one acre of land, and is not part of a larger common plan development, shall submit a Simplified SWMP. The steps to creating a robust storm water management plan as discussed above should be followed where applicable and appropriate. This plan requires approval by Fort Jackson. The Simplified SWMP shall contain the following items:

- Narrative description of the storm water management facilities to be used,
- General description of topographic and soil conditions at the development site,
- General description of the adjacent property and description of existing structures, buildings, and other fixed improvements located on surrounding properties,
- A sketch to accompany the narrative containing the following when applicable:

- site location drawing of the proposed project showing project location in relation to roadways, jurisdictional boundaries, streams, rivers and the boundary lines of the site to be developed,
- all areas within the site that will be included in the land disturbing activities shall be identified and the total disturbed area shall be calculated,
- anticipated starting and completion dates of the various stages of the land disturbing activities and the expected date of final stabilization shall be noted,
- location of temporary and permanent storm water management controls,
- Storm water management plans shall contain certification by the persons responsible for the land disturbing activities that the activities will be accomplished pursuant to the plan.

3.3 Submittal Requirements for Sites with Greater or Equal to than One Disturbed Acre

The person or entity responsible for any activity that is disturbing one acre or more acres or is part of a larger common plan development, shall submit a Land Disturbance Submittal Package as defined by this section. This action should be preceded by the submittal of a Storm Water Concept Plan, if requested by Fort Jackson. This plan requires approval by Fort Jackson. The site plans, erosion and sediment control plans, specifications, and supporting calculations and computations shall be submitted and stamped/sealed by professionally licensed engineers, landscape architects, Tier B land surveyors, or other qualified Federal Government employees. The steps to creating a robust storm water management plan as discussed above should be followed where applicable and appropriate.

The remainder of this section of the Handbook explains the information required to attain the desired Land Disturbance Permit from Fort Jackson. The items discussed in this section of the Handbook should be used as a checklist prior to the submittal of the permit application. The Land Disturbance Submittal Package can be processed efficiently if all necessary information is included with the permit application. With proper planning and coordination, the permit processing time requirements can be kept to a minimum.

3.3.1 Land Disturbance Permit Submittal Package Contents

The initial Land Disturbance Submittal Package shall contain:

- A completed Fort Jackson Application Form for Land Disturbance Activities,
- A completed SC DHEC Form #2612 - Notice of Intent (to comply with NPDES General Permit SCS0000000),
- A completed Fort Jackson Land Disturbance Submittal Summary Form,

- One (1) copy of the Final SWMP, including all necessary supporting technical calculations, and
- Four (4) complete sets of certified (w/ COA) and signed construction plans and specifications,
- All necessary fees.

All application forms required for submittal are provided in the appendices of this Handbook. Other avenues may be available in the future.

3.3.2 Permits

Unless specifically exempted, a Land Disturbance Permit and approved Final SWMP, as required by the Handbook, shall be obtained prior to the commencement of any development, redevelopment, building, excavating, grading, re-grading, paving, landfilling, berming or diking of any property located within Fort Jackson. Coverage under the General Permit is obtained through approval of the Land Disturbance Submittal Package from Fort Jackson.

Other applicable permits such as Federal, State or other local agency may be required for specific project sites. For example, the US Army Corps of Engineers must be notified for all disturbance activities effecting more than 1/3 of an acre in a Water of the State. It is the applicant's responsibility to recognize the need to obtain all necessary permits before submitting for the Land Disturbance Submittal Package.

3.3.3 Storm Water Management Design Standards and Technical Requirements of the SWMP

It is an overall goal of this Handbook to address storm water management to provide effective water quantity and water quality solutions due to the impact of land development on existing/natural hydrologic and hydraulic processes. The following set of criteria shall be followed in the absence of designated specific watershed master plan criteria.

3.3.3.1 General

The following items are required to be included in the submittal package for a Land Disturbance Permit as part of the SWMP. These items can be presented separately or on or part of others sections of the SWMP, i.e. construction documents. This list is followed by technical design requirements.

- Watershed delineation maps with consistent sequential notations,
- Narrative of the existing conditions at the site and the proposed storm water management plan and all component to be used,
- Location map showing all discharge points and drainage patterns (a 1:24,000 scale USGS topographic map is recommended for this portion),

- Location/drawing of existing and proposed structures used for storm water management, including outfalls, the collection system, and erosion control measures,
- Location of identified 100-year floodplains as presented on FIRM maps,
- Identification of any wetlands,
- Identification and classification of all soil types expected to be encountered or used at the development site,
- Presentation existing and proposed contours at the development site,
- General description of the adjacent property and description of existing structures, buildings, and other fixed improvements located on surrounding properties,
- Discussion of all methodologies and models to be used,
- Construction limits and sequence and maintenance requirements during and after construction,
- Site access, and
- Design details and computation for all storm water management controls, including storage facility routing, pipe capacity and velocity calculations, open channel capacity and velocity calculations, and water surface elevations.

3.3.3.2 Hydrologic computation requirements

All hydrologic computations shall be completed using acceptable volume based hydrograph methods. The design storm duration for these computations shall be the 24-hour storm event and a SCS Type II distribution with a 0.1-hour duration time increment. Typical hydrologic input includes but is not limited to the following:

- Rainfall depth or intensity,
- USGS soil classification and hydrologic soil group,
- Land use,
- Time of concentration, and
- Abstraction.

The remainder of this section will provide basic information for the hydrologic calculations needed in a project's SWMP. As discussed, the intent of the Handbook is not to provide detail on every aspect of hydrologic computations, their limitations, assumptions, appropriateness of

use, etc. However, this Handbook references suggested materials as necessary for detailed discussion of related topics.

3.3.3.2.1 Inputs

The precipitation depths/intensities corresponding to various return periods to be used for projects on Fort Jackson are shown in Table 3.1.

Table 3.1: Design storm precipitation data for Fort Jackson, South Carolina

First-Flush	2-yr	10-yr	25-yr	100-yr
1 st ½” runoff	3.7	5.7	6.4	7.9

Soil types on Fort Jackson are predominantly sands and sandy clays. Appendix E contains a soil map of Fort Jackson. Information on soil type and hydraulic classification for all parts of the fort can be found there. Land use information is required for modeling the appropriate runoff potential for a project. Existing land use and corresponding runoff potential factors should be obtained from the site visit. Appropriate runoff potential factors can be found in several of the references listed in Chapter 4.

3.3.3.2.2 Recommended methodologies

The Fort Jackson recommended methods and corresponding design circumstances are listed in Table 3.2 and Table 3.3 below. If other methods are used, they must first be calibrated to local conditions and tested for accuracy and reliability and then submitted to Fort Jackson for approval. In addition, complete source documentation must be submitted for approval.

Table 3.2: Recommended methodologies based on land disturbance area

Method	Size Limitations*	Comments
(Modified) Rational Method	0 – 2 Acres	Acceptable for sizing individual culverts or storm drains that are not part of a pipe network or system. <u>Not to be used for storage design.</u>
“SCS Method” (TR-55)	0 – 2000 Acres	Used for estimating peak flows from urban areas.
USGS Regression Equation	> 2000 Acres	Used for estimating peak flows for all design applications for areas between 2,000 and 16,000 acres and estimating hydrographs for all design applications for areas between 128 and 16,000 acres.

*Size limitations refers to the subwatershed size to the point where stormwater management facility (i.e., culvert, inlet, BMP) is located.

Details of Rational Method and Modified Rational Method can be found in Chow (1988), ASCE(1996), USDA (1996, 2001), and Mays (2001). When using this methodology, regional coefficients are needed to calculate the rainfall intensity. These regional coefficients can be found in the Richland County Land Development Regulation, Section 4 (<http://www.richlandonline.com/departments/publicworks/stormwater/forms/Design%20Standar>

[ds.pdf](#)). SCS Method documentation can be found on the US Department of Agriculture website (<http://www.wcc.nrcs.usda.gov/hydro/hydro-tools-models-tr55.html>). The USGS regression equations for South Carolina can be obtained from Appendix F, the US Geological Survey website (<http://water.usgs.gov/osw/programs/nffpubs.html>). In addition, the US Department of the Army and Air Force (1987a, 1987b) has two technical manuals addressing hydrology, “Surface Drainage Facilities for Airfields and Heliports” and “Drainage for Areas other than Airfields”. Complete references are given in Section 4.

Table 3.3: Recommended hydrologic methods for designing various storm water management systems and controls

Method	Rational Method	SCS Method	USGS Equations
Extreme Flood Protection		+	+
Storage/Sedimentation Facilities		+	+
Outlet Structures		+	+
Gutter Flow and Inlets	+		
Storm Drain Pipes	+	+	+
Culverts	+	+	+
Small Ditches	+	+	+
Open Channels		+	+
Energy Dissipation		+	+

Methods for calculating the time of concentration and abstraction are numerous. However, a minimum time of concentration of six (6) minutes shall be used for all hydrologic calculations. See references given above for the suggested methodologies for information on these calculations.

3.3.3.2.3 Hydrographs

Hydrographs should be used to evaluate entire systems by routing storm events through pipe or storage systems. The use of a hydrograph will provide better insight into a system performance than the use of peak discharge can. SCS (USDA 1986) has developed a tabular hydrograph procedure that can be used to generate hydrographs for small drainage areas less than 2,000 acres. The tabular hydrograph procedure uses unit discharge hydrographs that have been generated for a series of time of concentrations. In addition, SCS has developed hydrograph procedures to be used to generate composite flood hydrographs. The development of a runoff hydrograph from a watershed is a tedious, laborious process not normally performed by hand because of the simplicity of current computer model applications. Chow (1988) is also an excellent reference on this topic. Many computer models are now used to compute these

hydrographs using many types of methodologies. Fort Jackson will accept such models once it has been proven to precisely execute a given methodology.

3.3.3.3 Water quantity control requirements

Water quantity control is an integral component of overall storm water management. Its purpose is to negate the effects of development on large storm events. Quantity control is effectively flood control, reducing potential damages and health risks. The following design criteria are established for water quantity control. All designs of storage facilities utilized for storm water quantity control and required downstream analyses shall be submitted with the SWMP when applying for a Land Disturbance Permit.

- Potential controls include above ground wet or dry detention basins, and retention ponds.
- Post-development discharge rates shall not exceed pre-development discharge rates for the 2-, 10-, and 25-year frequency 24-hour duration storm events.
 - Multi-stage control structures may be required to control the 2-, 10- and 25-year storm events.
 - The same hydrologic procedures shall be used in determining both the pre-development and post-development peak flow rates.
- Post-development discharge velocities shall be reduced to provide non-erosive flow velocities from structures, channels or other control measures, or be equal to the pre-development 25-year 24-hour storm event flow velocities, whichever is greater.
- Emergency spillways shall be designed to safely pass the post-development 100-year 24-hour storm event without overtopping any dam structures.
- All dry detention basin volumes shall be drained from the structures within 72 hours. Volume control is encouraged using acceptable BMPs such as engineered devices, infiltration basins, and grassed swales.
- Downstream analysis shall be required for the 2-, 10-, 25-, and 100-year frequency 24-hour duration storm events for all development sites unless a waiver or variance is granted from this analysis. When water quantity controls are implemented, an off-site analysis waiver may not be required, provided that all required design criteria of the Handbook are met. Analysis should be performed for both existing and proposed conditions at a point where development is approximately 10 percent of total drainage area, locations of past quantity issues, where downstream residential sites exist, all road crossings, and others as directed by Fort Jackson. All system components are potential analysis items. Possible actions to mitigate development's impact include on- or off-site control or

improvement to downstream conveyance measures. Analysis criteria shall include, but is not limited to:

- existing land use curve numbers shall be used for developed areas upstream,
 - existing land use for upstream and downstream areas of interest may be used, but future land use, when applicable, is recommended for conservative results,
 - routing of flows using an accepted hydrologic and hydraulic method from Chapters 5, and 6,
 - hydraulic step-backwater calculations (Corps of Engineer's HEC-2 or HEC-RAS models or equivalent) shall be performed to determine flood elevations of any downstream impacted areas, and
 - the effects of any upstream and proposed storm water quantity or quality structures.
- Vegetated embankments shall be less than 15-feet in height and shall have side slopes no steeper than 3H:1V. Embankments protected with Erosion Control Blankets or Turf Reinforcement Matting shall be no steeper than 2H:1V. Geotechnical slope stability analysis is required for slopes greater than 10-feet in height and embankments that have steeper slope than those indicated above.
 - A minimum freeboard of 1-foot above the 100-year 24-hour design storm high water elevation shall be provided for impoundment depth less than 15-feet. Impoundment depths greater than 15-feet are subject to the requirements of the Federal Emergency Management Agency's (FEMA) Dam Safety Guidelines (FEMA 1998) unless the facility is excavated.
 - The bottom of detention structures shall be graded towards the outlet structure to prevent standing water conditions. A minimum 0.5% bottom slope is recommended.
 - The maximum depth of permanent storage facilitates shall be determined by site conditions, design constraints, and environmental needs. The facility should provide a permanent pool of water with a depth sufficient to discourage weed growth without creating undue potential for anaerobic bottom conditions. A depth of 6- to 8-feet is reasonable unless fishery requirements dictate otherwise. Aeration may be required for permanent pools to prevent anaerobic conditions. Wildlife experts shall be contacted when aquatic habitat is required.
 - A dam is defined as being an artificial barrier that impounds water to a depth of 15-feet or greater and has a maximum storage volume of 10 acre-feet or greater. Several exemptions may be allowed in FEMA's Dam Safety Guidelines Act and

any question concerning a specific design application should be addressed to the Fort Jackson.

- An access area is required comprised of a minimum of 10 feet along both sides of all drainage ways, streams, channels, ditches, and around the perimeter of all detention and retention facilities. Sufficient land area for equipment access for basin maintenance shall be provided.
- A safety fence shall be implemented around all storm water basins that are greater than 2-feet in depth.
- Watersheds that have well documented water quantity problems may have more stringent or modified design criteria determined from master plan studies. Such situations will be dictated by Fort Jackson. Some examples of variable criteria include but are not limited to:
 - post-development discharge rates from the entire development area not exceeding pre-development discharge rates for storm frequencies greater than the 25-year frequency 24-hour duration storm event,
 - post-development discharge volumes from the entire development area not exceeding pre-development discharge volumes,
 - reduction of peak flow rates from pre-development to post-development,
 - reduction of total volume released from pre-development to post-development, and
 - downstream channel, culvert or property improvements.
- A project may be eligible for a waiver from the storm water management requirements for water quantity control if the applicant can justly verify that:
 - the proposed project will not create any significant adverse effects on the receiving natural waterway downstream of the property and
 - the imposition of peak flow rate control for storm water management would create, aggravate, or accelerate downstream flooding.

Documentation on the design, installation, and maintenance of storage facilities can be found in USDA (2001b), ASCE & WEF (1994), and Mays (2001).

3.3.3.3.1 Accepted storage controls

Detention structural controls are used for providing water quantity control and are typically used downstream of other minor structural controls. These structures are designed to provide channel protection, overbank flood protection, and any adverse downstream impacts that are related to

the increase in peak flow rates and flow volumes from development. Detention structural storm water controls accepted by Fort Jackson are shown in Table 3.4.

Table 3.4: Accepted storage controls

General Structural Control	Description
Dry Detention/Dry Extended Basins	Dry detention basins and dry extended detention basins are surface storage facilities intended to provide temporary storage of storm water runoff and releasing it at a designed flow rate to reduce downstream water quantity impacts. These structures are designed to completely drain to a dry condition within 72 hours.
Wet Storm Water Detention Basins <ul style="list-style-type: none"> • Wet Pond • Wet Extended Detention Pond • Micropool Extended Detention Pond • Multiple Pond System 	Wet detention basins are constructed storm water basins that have a permanent pool or micropool of water. Runoff from each rain event is detained above the permanent pool and released at a designed flow rate to reduce downstream water quantity impacts.
Multi-purpose Detention Areas	Multi-purpose detention areas are used for one or more specific activities such as parking areas and rooftops. These areas are used to provide temporary storage of runoff. Some of the multi-purpose area such as infiltration trenches or bio-retention areas may also be used for water quality purposes.
Underground Detention	Underground detention is used as an alternative to surface dry-detention basins. They are used in areas that are space-limited where there is not enough adequate land to provide the required detention volume. The underground storage utilizes tanks, vaults, and buried pipes to supply the required storage volume.

3.3.3.3.2 Design procedures

This section provides the general procedures for the design of storm water quantity structures. The following items shall be required for the design of these structures and routing flows through them:

- Compute the inflow hydrograph for the structure.
- Compute a stage-storage relationship for the proposed structure. A stage storage-curve defines the relationship between the depth of water and storage volume within the detention facility.
- Compute stage-discharge relationship of the outlet control structure(s).
- Perform routing calculations for the 2-, 10-, 25- and 100-year 24-hour storm events. These may be done by hand, or may be done by using a storage routing computer model.
- Evaluate the control structure outlet flow velocity and provide velocity control and channel stabilization if needed. Standard drawings are provided for preferred outlet structures. Other will be accepted once evidence is submitted proving its ability to perform as designed.

Routing of hydrographs is critical to the proper design of storm water quantity control structures. Storage design procedures have been formulated without using routing, but the use of these methods in designing storm water quantity structures has not produced acceptable results for the Southeastern United States.

Stage-storage and stage-discharge calculations should be included in the SWMP. Common methodologies for stage-storage curves include the double end area method, and the pyramid frustum method. Other methods will be accepted upon justification of their integrity.

Hand calculations are available for routing hydrographs through detention structures, however they are time consuming and inefficient when multiple designs are required to be evaluated. For this Handbook, it is assumed that the design professional will be using one of the many computer software packages available to perform storage routing calculations. All models/methodologies used should be acceptable to Fort Jackson.

3.3.3.4 Water quality control requirements

Water quality control is an integral component of overall storm water management. The following design criteria are established for water quality control unless a waiver is granted on a case-by-case basis.

- Permanent water quality ponds and water quality structures having a permanent pool elevation shall be designed to store and release the first ½-inch of runoff from the site over a minimum period of 24-hours in addition to satisfying flow

rate control for the 2-, 10-, and 25-year storm events. The storage volume of these water quality structures shall be designed to accommodate at least ½-inch of runoff from the entire site. The Urban Drainage and Flood Control District around Denver, Colorado (UDFCD 2003) offers another method for estimating this required water quality volume.

- Permanent water quality structures not having a permanent pool elevation shall be designed to store and release the first 1-inch of runoff from the site over a minimum period of 24-hours.
- Permanent water quality infiltration practices shall be designed to accommodate at a minimum the first 1-inch of runoff from impervious areas located on the site.
- When existing wetlands are intended to be water quality facilities, the Storm Water Management Permit shall not be implemented until all necessary Federal and State permits have been obtained.
- Commercially available products can be used as water quality control measures. Applicability of such devices will be determined on a project-by-project basis.

3.3.3.4.1 Water quality BMPs

The varieties of water quality BMPs are numerous. With the proper planning, installation, and maintenance, BMPs can be expected to reduce pollutant loads to receiving waters, reduce erosion, provide health and safety benefits, and be cost effective. BMPs are considered either structural or non-structural. Fort Jackson's current approved list of storm water quality BMPs and a description of each are given in Table 3.5. This is followed by a brief discussion of some recommended non-structural BMPs and suggested innovative approaches, including Low-Impact Development (LID), which are encouraged and accepted.

All storm water quality BMPs must be designed in accordance with the Handbook, installed properly, and be properly maintained. Further information on the design of structural BMPs can be found in NVPDC (1992), Schueler (1987), and WEF & ASCE (1998).

Table 3.5: Structural controls

General Structural Control	Description
Wet Ponds	Wet storm water ponds are constructed storm water basins that have a permanent pool or micropool of water. Runoff from each rain event is detained and treated in the pool, and released at a designed rate.
Storm Water Wetlands	Storm water wetlands are constructed wetland systems used for storm water management. Storm water wetlands consist of a combination of shallow marsh

General Structural Control	Description
	areas, open water and semi-wet areas above the permanent water surface.
Bioretention Areas	Bioretention areas are shallow storm water basins or landscaped areas that utilize engineered soils and vegetation to capture and treat storm water runoff. Runoff may be returned to the conveyance system or partially exfiltrate into the soil.
Sand Filters	Sand filters are multi-chamber structures designed to treat storm water runoff through filtration, using a sand bed as its primary filter media. Filtered runoff may be returned to the conveyance system or partially exfiltrate into the soil.
Infiltration Trench	An infiltration trench is an excavated trench filled with stone aggregate used to capture and allow infiltration of storm water runoff into the surrounding soils from the bottom and sides of the trench.
Enhanced Grassed Swales	Enhanced swales are vegetated open channels that are explicitly designed and constructed to capture and treat storm water runoff within dry or wet cells formed by check dams or other structures.
Engineered Devices <ul style="list-style-type: none"> • Vortex Separator • Baffles • Cartridges • Skimmers • Bioretention • Gravity Oil-Grit Separator • Filter Material • Sedimentation • Inlet inserts • Constructed wetland uptake. 	Pre-fabricated controls use the movement of storm water runoff through a specially designed structure to remove target pollutants. They are typically used on smaller commercial sites and urban hotspots. There are numerous commercial vendors of these structures, but there is limited data on the performance of these structures. Until further research is done and substantial removal efficiencies are published, these structures may require monitoring. Some of the popular vendors/products include but not limited to Crystal Stream, Vortechtechnics, Aquashield, Filterra, Stormceptor, Stormfilter, CDS, BaySaver, and Downstream Defender. This is by no means a complete list and Fort Jackson will evaluate any such device if included in designs.

Some structural BMPs have limited applications and recommended only for limited use for special site or design conditions. Generally, these practices can not alone achieve 80 percent TSS removal goal and are intended for hotspots for specific land use constraints or conditions. Limited application controls may be used within a system of water quality controls and are very effective pre-treatment structures for the controls listed in Table 3.5. Limited application structural controls should be designed and used only in development situations where regular maintenance is guaranteed. Some popular limited storm water controls are shown in Table 3.6.

Table 3.6: Limited structural controls

Limited Structural Control	Description
Vegetated Filters <ul style="list-style-type: none"> • Filter Strip • Grassed Channels and Swales 	Both filter strips and grassed channels provide filtering of storm water runoff as it flows across the vegetation. However, by themselves these controls do not consistently obtain an 80% TSS removal. Both filter strips and vegetated channels shall be used as pretreatment measures or part of a treatment system approach.
Submerged Gravel Wetland Systems	Submerged gravel wetlands use wetland plants in a submerged gravel or crushed rock media to remove storm water runoff pollutants. These systems should only be used in mid- to high- density environments where other structural controls will be utilized.
Small Sand Filters <ul style="list-style-type: none"> • Surface Sand Filter • Perimeter Sand Filter 	Sand filters are multi-chamber structures designed to treat storm water runoff through filtration, using a sand bed as its primary filter media. Filtered runoff may be returned to the conveyance system or partially exfiltrated into the soil.
Porous Paver Systems	Porous paver systems consist of open void paver units laid on gravel subgrade to promote storm water infiltration. Porous pavers provide water quality and quantity benefits, but have high maintenance requirements.

Regardless of the control, maintenance schedules should be included for each BMP proposed. This will provide adequate planning and cost allocation to Fort Jackson, who is responsible for all maintenance activities.

Listed below are some non-structural BMPs that should be considered for use in larger land disturbance activities and re-development projects.

- Buffers: an area along a shoreline, wetland, or stream where development is restricted or prohibited. The primary function of the buffer is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment.
- Disconnected roof drains/impervious areas: directing storm water runoff from rooftops towards pervious areas where it is allowed to filter through vegetation and other landscaped material and infiltrate into the soil.
- Grass/Porous pavements: allows for the reduction of paved areas by implementing areas that are infrequently used, providing water quality benefits through increased infiltration.
- Cluster development: concentrate development away from environmentally sensitive areas such as streams, wetlands, and mature wooded areas.

3.3.3.5 Erosion prevention and sediment control requirements

The following items are required to be included as part of the SWMP addressing erosion prevention and sediment control (EPSC). EPSC plans are required for all activities disturbing more than 5,000 ft² or as required by Fort Jackson. These items can be presented separately or be part of other sections of the SWMP. Fort Jackson prefers that the EPSC plans be presented separately. This is not only a proactive measure to safeguard downstream environments, but is particularly important due to the erodibility of the soils common on Fort Jackson.

- Location of all erosion and sediment control structures,
- Delineation of all sensitive features and potential sediment sources,
- Installation sequencing and maintenance schedules for all EPSC BMPs during and after construction,
- Provisions to preserve topsoil and limit the amount of total disturbed area,
- Details of site grading,
- Design details and computations for all EPSC structures,
- Silt fencing shall be placed at the toe of all fill slopes and soil berms and below disturbed areas where the size of the area is no more than ¼ acre per 100 feet of

silt fence length. The maximum slope length behind the fence is 100 feet and the maximum gradient behind the fence is 25 percent.

- Protection of all storm drain inlets and outlets,
- List of the trapping efficiency for each sediment control structure,
- Calculation of required sediment storage volumes, and
- Explanation of any computer models or software used with highlights of and/or notes on the output data.

The following nonstructural site management practices shall be utilized on the plans where applicable:

- Minimize site disturbance to preserve and maintain existing vegetative cover,
- Limit the number of temporary access points to the site for land disturbing activities,
- Phase and sequence construction activities to minimize the extent and duration of disturbed soil exposure, and
- Locate temporary and permanent soil disposal areas, haul roads and construction staging areas to minimize erosion, sediment transport and disturbance to existing vegetation.

3.3.3.5.1 Design removal efficiency goal

Sediment control structures shall be designed to accommodate the anticipated sediment loading from all land disturbing activities and meet a design removal efficiency of 80 percent total suspended solids (TSS) or 0.5 ml/L peak settleable solids concentration, whichever is less, for disturbed conditions for the 10-year 24-hour storm event.

3.3.3.5.2 Design requirements

A sediment detention basin is required when 10 or more acres of disturbed land area drain to a single outlet point. Such basins shall be designed to have a design removal efficiency of 80 percent suspended solids (TSS) or 0.5 ml/L peak settleable solids concentration, and control the 10-year 24-hour storm event to pre-development conditions and successfully pass the 100-year 24-hour storm event. The person responsible for the activity shall submit a full application which shall be prepared or certified by a registered engineer, landscape architect, Tier B land surveyor, or other qualified Federal Government employees.

Activities that disturb between 1 and 10 acres of land area that does not drain to a single outlet point may incorporate other practices other than a sediment basin to achieve the equivalent removal efficiency.

Sediment storage volumes shall be calculated for all sediment controls to determine the required clean-out frequencies and maintenance schedules. The Universal Soil Loss Equation (USLE) or other acceptable methods that determine sediment yield may be used to predict the required sediment storage volumes for specific sediment control structures.

Detailed EPSC plans shall comply with the following specific standards and review criteria:

- Sediment Tracking Control. Stabilized construction entrances shall be located and utilized at all points of ingress/egress on a construction site. The transfer of soil, mud, and dust onto roads shall be prevented.
- Crossings of waterways during construction should be minimized and must be approved by Fort Jackson. Encroachment into stream buffers riparian areas and wetlands should be avoided when possible.
- Topsoil shall be stockpiled and preserved from erosion or dispersal both during and after site grading operations when applicable.
- Temporary Stabilization Measures. Where construction or land disturbance activity will or has temporarily ceased on any portion of a site, temporary site stabilization measures shall be required as soon as practicable, but no later than 14 calendar days after the activity has ceased.
- Final Stabilization. Final Stabilization of the site shall be required within 14 calendar days of construction completion.
- Temporary Structural Controls installed during construction shall be designed to accomplish maximum stabilization and control of erosion and sedimentation, and shall be installed, maintained, and removed according to the specifications set forth in the Handbook, Standard Specifications and Standard Drawings. All temporary structural controls shall be designed to control the peak runoff resulting from the storm event identified in the Handbook, Standard Specifications and Standard Drawings.
- All Permanent Structural Controls, including drainage facilities such as channels, storm sewer inlets, and detention basins, shall be designed according to the standards set forth in the Handbook, Standard Specifications and Standard Drawings.

3.3.3.5.3 Alternative erosion prevention and sediment control BMPs

To encourage the development and testing of innovative alternative EPSC BMPs, alternative management practices that are not included in the Handbook or Standard Drawings (Appendix G) may be allowed upon review and approval. To use an alternative BMP, the design professional shall submit substantial evidence that the proposed measure will perform at least equivalent to currently approved BMPs contained in the Handbook and Standard Drawings. Evidence may include, but is not limited to:

- Supporting hydraulic and trapping efficiency calculations.
- Peer-review by a panel of licensed professional engineers.
- Research results as reported in professional journals.
- Manufacturer literature.

3.3.3.5.4 Design procedures

Control of sedimentation from construction sites may be accomplished through the utilization of a variety of EPSC BMPs. The complexity of the erosion and sediment control plan will vary depending on the individual site conditions. The goal of implementing the erosion control plan is to limit the quantity of sediment being eroded from, and leaving a construction site. This may be partially accomplished through the implementation of EPSC BMPs. However, these sediment trapping controls typically only remove a small portion of the clay particles eroded from the site. The best protection is provided by a combination of practices including temporary and permanent stabilization, flow diversions, and streambank protection, all which minimize the amount of soil that is eroded from the site.

All land development shall be planned in such a way to control and limit erosion and sediment discharge from construction sites using, but not limited to, the BMPs listed in this chapter. The goal of these erosion and sediment control BMPs shall be to:

- Minimize the extent and duration of disturbed soil exposure,
- Protect off-site and downstream locations, drainage systems and natural waterways from the impacts of erosion and sedimentation,
- Limit the exit velocities of the flow leaving the site to non-erosive or pre-development conditions, and
- Design and implement an ongoing inspection and maintenance plan.

3.3.3.5.5 Erosion prevention measures

Erosion prevention measures shall be used during and after construction site preparation in order to safely convey clean water to storm drains or adequate watercourses. One or more measures should be utilized as appropriate during the project's construction phase. Such measures may include but are not limited to: phasing and construction sequencing, surface roughening, temporary seeding, mulching, matting, rip-rap or aggregate (channels, aprons, outlets, etc.) and geotextile blankets. Details on each and of these measures and others, including design, installation, and maintenance, can be found in Appendix G and SCDHEC (2002).

In addition to site-specific erosion control measures, the grading plan should include the following general measures as a minimum:

- The finished cut and fill slopes to be vegetated should not be steeper than 3H:1V. The finished grades of cut and fill slopes to be vegetated with vines and/or groundcovers should not be steeper than 1H:1V.
- Cuts or fills should not be so close to property boundaries as to endanger adjoining property without adequately protecting such properties against erosion, sedimentation, slippage, settlement, subsidence, or other damages.
- Subsurface drainage should be provided in areas having a high water table to intercept seepage that would affect slope stability, bearing strength or create undesirable wetness.
- No fill shall be placed where it can slide or wash onto another property.
- Fill shall not be placed adjacent to channel banks where it can create bank failure, reduce the capacity of the stream, or result in downstream sediment deposition.
- All borrow and disposal areas should be included as part of the grading plan.
- Adequate channels and floodways should be provided to safely convey increased runoff from the developed area to an adequate outlet without causing significant channel degradation, or increased off-site flooding.
- The site should be graded to direct flows to appropriate controls.

3.3.3.5.6 Temporary sediment control measures

Fort Jackson emphasizes erosion prevention in EPSC plans. However, there are always instances where erosion can not be prevented. For these situations, temporary sediment controls must be implemented to control the migration of eroded sediment off site. The following sediment control measures are applicable as temporary practices for use during construction. One or more of the measures should be utilized as appropriate during the project's construction phase. A discussion of the planned measures will be required during the review of the Storm Water Concept Plan for sites containing sensitive features.

There are many types of temporary control measures. Some of the more common and suggested include: temporary sediment and multipurpose basins, sediment traps, silt fences, rock and composite check dams, inlet protection, vegetated filter strips, and rock sediment dikes. There are also many proprietary devices such as socks and tubes available or inlet protection, berms, dikes, check dams and many other EPSC purposes. These devices will be evaluated by Fort Jackson as necessary. Details on these and others measures are again not discussed in detail in the Handbook. An excellent reference is Hann, Barfield, and Hayes (1995).

3.3.3.5.7 Runoff controls and conveyance measures

In addition to temporary measures, EPSC BMPs that control runoff should in addition to other BMPs listed in this Handbook provide the overall protection of downstream environments.

Suggested varieties include pipe slope drains, protection at stream crossings, de-watering, level spreaders, subsurface drains, diversion dikes, and berms. Details on these and other EPSC BMPs can be found in Appendix G.

3.3.3.5.8 Permanent vegetation

The following design requirements shall be followed to establish permanent vegetation:

- Planting Specifications:
 - 1.5 tons of agricultural lime per acre (70 #/1000 square feet)
 - when hydroseeding, 2 gallons liquid lime per acre in addition to agricultural lime
 - 700 # 10-10-10 fertilizer ,or equivalent, per acre (16# per 1000 square feet)
 - Incorporate lime and fertilizer
 - Plant seed using conventional planting, broadcast, or hydroseeding methods
 - Mulch with 1 ½ tons per acre wheat straw
 - Crimp straw into soil or use a tackifier to hold straw in place
- Suggested Seeding Mixtures

**Table 3.7: Tall grass mixture for spring/summer seeding in unmowed areas
(optimum date to plant is March 1st – June 15th)**

Seed	Pounds / Acre	Ounces / 1000 ft ²	Minimum % purity	Minimum % germination	Footnotes
*Oats	10	4	98	85	
Browntop millet	10	4	98	85	
Bahiagrass	25	8	65	70	
Appalow secretia lespedeza (scarified)	20	8	98	85	(1) (2)
Weeping lovegrass	2	1	95	80	
Kobe	5	2	97	85	(1)

Seed	Pounds / Acre	Ounces / 1000 ft ²	Minimum % purity	Minimum % germination	Footnotes
lespedeza					(2)
Switchgrass	2 PLS (3)	1			

*Oats should be added to mixture if seeding date is prior to April 15.

Table 3.8: Turf mixture for spring/summer seeding in mowed and maintained areas (optimum date to plant is March 1st – June 15th)

Seed	Pounds / Acre	Ounces / 1000 ft ²	Minimum % purity	Minimum % germination	Footnotes
Browntop millet	10	4	98	85	
Bahiagrass	30	11	65	70	
Common bermudagrass (w/o hull)	6-8	3-4	97	85	

Table 3.9: Tall grass mixture for fall/winter seeding in unmowed areas (optimum date to plant is September 1st – November 15th)

Seed	Pounds / Acre	Ounces / 1000 ft ²	Minimum % purity	Minimum % germination	Footnotes
Rye (grain)	56	21	97	85	
Bahiagrass	40	15	65	70	
Appalow sericea Lespedeza (unscarified)	60	22	98	85	(1) (2)
Switchgrass	2 PLS	1			(3)
Crimson Clover	5	2			

Table 3.10: Turf mixture for fall/winter seeding in mowed and maintained areas (optimum date to plant is September 1st – November 15th)

Seed	Pounds / Acre	Ounces / 1000 ft ²	Minimum % purity	Minimum % germination	Footnotes
Rye (grain)	56	21	97	85	
Bahiagrass	40	15	65	70	
Common bermudagrass (w/o hull)	8	4	97	85	

* Common bermudagrass with hulls can also be planted from January 10th – March 20th)

Footnotes: (1) Includes hard seed

(2) Seeds of appalow sericea lespedeza, Kobe lespedeza, and Crimson Clover shall be inoculated with an appropriate culture of nitrogen-fixing bacteria. The inoculate shall be applied in accordance with the manufacturer's directions. (If hydroseeding, use 4 times the recommended rate or inoculant).

(3) Pure live seed: Seed germination shall not be less than 50%.

- Suggested maintenance fertilizer: Maintenance Fertilizer. In the nutrient-poor soils of Fort Jackson, all seeded areas should have a follow-up application of fertilizer at the beginning of the second growing season at a rate of approximately 500 pounds of 10-10-10 or equivalent (11# per 1000 square feet).

3.3.3.6 Storm water drainage system design

This section provides the design requirements for various storm sewer drainage/collection system components including: design storms, velocities; and, pipe and inlet sizes.

3.3.3.6.1 Design requirements

Storm drainage systems shall include all storm drainage structures and pipes that do not convey runoff under roadways. These systems are commonly referred to as lateral closed systems.

The storm drainage systems shall be designed based upon the following criteria:

- 25- year 24-hour design storm event capacity for pipe design,
- 25- year 24-hour design storm event capacity for inlet structure design,
- 25- year 24-hour design storm event capacity for drainage channels,
- 50-year 24-hour design storm event capacity for sump inlets, unless overflow facilities are designed,
- 00-year 24-hour storm event shall be used to check all drainage designs using for local flooding, and possible flood hazards to adjacent structures and/or property.
- The Rational Method and SCS Method for peak runoff flow rates are acceptable techniques (see section 3.3.3.2 for limits on drainage areas),
- The minimum pipe size is 15 inches,
- Hydraulic grade line and head loss calculations for determining water surface elevations shall be performed for all systems with 10 or more connections,
 - calculations should be performed for the 25-year 24-hour design storm event,

- for storm drainage systems with less than 10 connections, Manning's Equation shall be acceptable for sizing the capacity of drain pipes for non-submerged conditions where the free water surface elevation is below the crown of the pipes,
 - if the outlet is submerged in a backwater condition, a more sophisticated design methodology than Manning's Equation shall be required. Individual head losses in the pipe systems shall be calculated. These head losses are added to a known downstream water surface elevation to give a design water surface elevation for a given flow at a desired upstream location. Various accepted computer models are available for analysis of storm drain systems under backwater and/or pipe flow surcharge conditions,
 - storm drain profile plots should be included in the set of construction plans.
- Minimum design velocity for pipe flow shall be 2.0-feet/sec at the design flow or 2.5-feet/sec at full flow, whichever requires the greater slope,
 - Maximum design velocity shall be 20-feet/sec,
 - Minimum slope of storm drain systems shall be 0.5 percent,
 - Storm drainage systems shall be designed to convey storm water runoff by gravity flow unless otherwise approved,
 - For very flat flow lines, flow velocities shall increase progressively throughout the system. Upper reaches of the pipe system may have flatter slopes than the lower end of the system. Progressively increasing slopes keep solids moving toward the outlet and inhibit the settling of particles,
 - All discharges should be to existing structures. Justification that discharge rates from proposed development does not adversely impact existing drainage features should be included as necessary,
 - Minimum fill cover on all pipes shall be 1-foot. The maximum cover shall be based on the design loads which are calculated from pipe shape, pipe size, pipe material and location,
 - The following design requirements shall be followed to compute the capacity of storm drain inlets and grates by applying appropriate weir, orifice, and pipe flow characteristics:
 - inlets shall be designed to convey the 10-year 24-hour storm event,

- maximum depth in which the water may pond above or around an inlet must not threaten surrounding permanent structures or facilities including vehicular or pedestrian traffic,
- inlets placed in sump conditions shall have emergency overflow points designed,
- inlets placed in roadway gutter lines must be spaced to prevent flow from entering road intersections,
 - maximum spread of 6-feet in the travel lane.
 - valley gutter shall have a maximum allowable spread of 7-feet.
 - standard 2-feet 6-inch curb and gutter is allowed a total maximum spread of 8-feet from the face of the curb.

In depth design procedures for inlet and storm sewer design may be referenced in AASHTO (1999), Yen (2001).

3.3.3.7 Open channel hydraulics

Open channels shall include all permanent storm drainage channels including swales, culverts, and diversions. These storm drainage systems shall be designed based upon the following criteria:

- Channels shall be designed to carry the 25-year 24-hour design storm event.
- Major channels may be designed for greater storm frequencies if directed by Fort Jackson.
- Design conditions can be assumed to be steady, uniform flow.
- Minimum channel slope shall be 0.5 percent, unless supporting calculations show that there will be no pools or standing water areas formed in the channels at smaller slopes.
- Except for roadside ditches, the side slopes of grassed lined channels without Erosion Control Blankets or Turf Reinforcement Matting shall be no steeper than 3H to 1V.
- Manning's Equation may be used to design open channels and swales where backwater effects created from obstructions and/or tailwater is not present.
- Channels may be designed with multiple stage levels with a low flow section to carry the 2-year storm event and a high flow section to carry storms of larger frequencies.

- Maximum flow velocities shall be determined based on the channel bottom material and bank slope material. Table 3-11 contains an expanded list of permissible velocities for various different types of channel vegetation and slopes.
- Fort Jackson allows vegetated channels. Guidance on the design of these type channels can be found in Haan et. al. (1995) or by using computer software that is capable of calculating for stability and capacity.
- Culvert design shall include all cross drainage facilities that transport storm water runoff under roadways. Culvert selection techniques can range from solving empirical formulas, to using nomographs and charts, to comprehensive mathematical analysis for specific hydraulic conditions. The many hydraulic factors involved make precise evaluation time consuming and difficult without the help of computer programs and models. The actual models used for these calculations shall be at the discretion of the design professional with approval from Fort Jackson. Designs shall be based upon SCDOT requirements where applicable. The following criteria shall be followed:
 - All cross-drain culverts shall be designed to pass the 25-year 24-hour design storm event without overtopping the road.
 - All interior culverts shall be designed to pass the 10-year 24-hour design storm event without overtopping the road.
 - Additional hydraulic capacity shall be required as necessary to prevent backwater effects that may adversely impact upstream property or structures.
 - Acceptable models for designing culverts include, but are not limited to:
 - HY8
 - SEDCAD4
 - Pond Pack
 - HEC-RAS
 - Culvert Master

Table 3-11: Maximum permissible velocities for vegetated channels

Cover	Permissible Velocity (ft./sec.)*					
	Erosion Resistant Soils % Slope			Easily Eroded Soils % Slope		
	0-5	5-10	> 10	0-5	5-10	> 10
Bermuda Grass	8	7	6	6	5	4
Bahia						

Cover	Permissible Velocity (ft./sec.)*					
	Erosion Resistant Soils			Easily Eroded Soils		
	% Slope			% Slope		
	0-5	5-10	> 10	0-5	5-10	> 10
Buffalo Grass						
Blue Gamma						
Centipede Grass	7	6	5	5	4	3
Tall Fescue						
Kentucky Bluegrass						
Red Canary Grass						
Grass-legume Mixture	5	4	NR	4	3	NR
Lespedeza Sericea						
Weeping Lovegrass						
Kudzu						
Alfalfa	3.5	NR	NR	2.5	NR	NR
Small Grains						
Temporary Vegetation						

* Allow velocities over 5 ft/sec only where good cover and maintenance will be provided. If poor vegetation exists due to shade, climate, soils or other factors, the permissible velocity shall be reduced by 50 percent.

NR = Not Recommended

Sources: Elementary Soil and Water Engineering, Shwab et. al. and Hann et. al. (1995)

3.3.3.8 100-Year Floodplain

The goal of this section of the Handbook is to provide an overview of the requirements and procedures for proposed land development occurring in the 100-year floodplain (floodplain). Development is defined as any manmade change to improved or unimproved property including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations.

3.3.3.8.1 Floodplain policy

The provisions in this section apply to all development in areas of special flood hazard identified by the Federal Insurance Administration in its Floodway Boundary Map and Flood Insurance Rate Maps Community #450079C, panels 0113G, 0115G, 0120G, 0150G, 0176G, 0177G, 0185G, dated January 19, 1994, panel 0110H, dated February 20, 2002, and any revisions thereto.

It is the purpose of this section to promote the public health, safety and general welfare and to minimize losses due to flood conditions in specific areas by provisions designed to:

- Restrict or prohibit uses that are dangerous to health, safety and property due to water or erosion in flood heights or velocities.

- Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Control the alteration of natural floodplains, stream channels and natural protective barriers, which are involved in the accommodation of floodwaters;
- Control filling, grading, dredging and other development which may increase erosion or flood damage; and
- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

3.3.3.8.2 Floodplain standards

The following is a general summary of the provisions of FEMA:

- Development within the limits of a floodplain can not cause an increase of the level of the base flood. If such increase is anticipated, then the applicant must submit an application for a Conditional Letter of Map Revision (CLOMR) to Fort Jackson and FEMA.
- If an adverse effect is determined, engineering justification by the use of hydraulic computer models and compensatory storage at hydraulically equivalent sites for the proposed development shall be required.
- No structures are allowed within the floodway or adopted regulatory floodplain in Unnumbered A Zones unless acceptable engineering justification is provided.
- There is a 1-foot freeboard requirement on all new construction and substantial improvements within the 100-year floodplain.
- All new construction or substantial improvements shall be constructed on properly designed and compacted fill (ASTM D-698 or equivalent) that extends beyond the building walls before dropping below the base flood elevation and has appropriate protection from erosion and scour. The design of the fill or the fill standard must be approved by a registered engineer or meet the engineered support requirements similar to those for V-Zones (as set out in 44 CFR 60.3 (e)(4)).
- All new and replacement water supply and sanitary sewer systems must be designed to minimize or eliminate infiltration into the system.

3.3.3.8.3 Floodplain study general criteria

All floodplain studies shall follow the guidelines and procedures as set forth by FEMA and Fort Jackson. The general criteria and requirements have been established to help clarify the procedures related to performing a floodplain study in Fort Jackson are as follows:

- The project must be consistent with applicable State and Federal regulations,
- A professional engineer registered in the State of South Carolina shall prepare all studies,
- The following hydraulic computer models for floodplain development on Fort Jackson are recommended but are not limited to:
 - HEC-RAS and
 - WSPRO,
- The floodplain analysis shall include the 10-, 50-, 100-, and 500-year, 24-hour storm events,
- Hydrologic analyses should utilize the current land use conditions based on the most updated data within the desired watershed (FEMA only allows for consideration of existing conditions in the watershed; Fort Jackson can require particular models to be based on built-out conditions for its own purposes, but FEMA will not accept these future conditions in the FEMA submittal),
- Volume as well as peak flow shall be evaluated,
- Limits of the 100-year floodplain for the pre-development and post-development conditions shall be shown on the site plan,
- Backwater conditions, local obstructions, bridges, culverts, and storm water conveyance systems shall be considered,
- Digital data shall have the following characteristics:
 - horizontal datum: NAD83 (1986),
 - coordinate system: UTM Zone 17,
 - vertical datum: NAVD88, and
 - units: international feet,
- Data capture methods must result in new data meeting national horizontal and vertical accuracy standards, which are scale dependent. Horizontal accuracy standards are approximately (+/-) 2.5-feet, +/- 5.0-feet, and (+/-)10.0-feet, respectively for each mapping scale. Vertical accuracy is (+/-) one half of the contour interval for a given area.
- All proposed work within Unnumbered A zones must be accompanied by hydrologic and hydraulic modeling.

- Calculated flood boundaries shall be submitted in a digital format that is compatible with Fort Jackson's GIS data.

3.3.3.8.4 Floodplain study submittal criteria

Each permit must include:

- Applicants name
- Location where the work will be done

A type of development must be chosen. If the work being done falls into "other", please elaborate in the comments section.

Under "Flood Zone" all properties that have floodplains must check either "No. A or A Zone". The No. A zones are floodplain areas that have had a detailed study performed and a base flood elevation is known. The base flood elevation in A zones have been approximated.

Under "Location in relation to Floodway/Floodplain", all properties that have floodplains must chose "inside adopted floodplain". In the comments section, if the work to be done includes a structure, make a note as to whether the structure is located within the floodplain.

The application must be signed and stamped by a South Carolina Registered Engineer, Surveyor, or other qualified Federal Government employees and the applicant must sign the application.

Hydrologic and hydraulic analyses must be contained in a report describing the study methodology, a listing of all assumptions (e.g., rationale for Manning's 'n' values, reasons for revising hydrology, source of topographic information and land use), bridge and cross section data, and a brief description of the project.

All projects being submitted to FEMA must have a completed FEMA MT-1 or MT-2 form as appropriate. These forms can be obtained from the following.

FEMA website

www.fema.gov

FEMA Region IV

3003 Chamblee Tucker Road
Atlanta, Georgia 30341
(770.220.5400)

The South Carolina Department of Natural Resources

Flood Mitigation Program
2221 Devine Street, Suite 222
Columbia, South Carolina 29205
(803.734.9103)

3.3.4 Storm Water Facility Ownership and Maintenance

3.3.4.1 Ownership

All permanent storm water management facilities shall be owned and maintained by Fort Jackson.

3.3.4.2 Maintenance

A permanent maintenance plan for each permanent storm water management facility shall be included in the Final SWMP. This will allow Fort Jackson to plan and coordinate future maintenance activities.

3.4 Plan Submittal, Review, and Approval Process

3.4.1 Plan Submittal

When the Fort Jackson receives the initial Submittal Package, it shall be reviewed by a certified plan reviewer for compliance. After the plans have been reviewed to determine compliance with the regulations set forth by this Handbook, the plan reviewer will contact the applicant/design professional and request any necessary changes, or notify the applicant/design professional that the plans are in compliance.

3.4.2 Plan Review Period

The Storm Water Concept Plan may be reviewed if needed with the designer and will be approved, approved with changes, or rejected.

Upon approval of the Storm Water Concept Plan and receipt of the Final SWMP, a complete Submittal Package is to be submitted, after which, Fort Jackson shall accomplish its review and have either the approval or review comments transmitted to the applicant.

Fort Jackson shall conduct its review of a waiver or variance submitted by the applicant within twenty (20) working days of the submittal. Failure of Fort Jackson to act on the waiver by the end of this period will result in the automatic approval of the waiver.

3.4.3 Incomplete Storm Water Management Permit Applications

Engineering design plans, permit applications, specifications, and submittal packages submitted to Fort Jackson that do not meet the minimum requirements of this Handbook shall be handled in the following manner:

- If the original Submittal Package has all of the major components in accordance with Chapter 3 but is missing some information, a written notice will be sent to the applicant.
- The written notice from Fort Jackson shall state the following:

- the specific information that must be re-submitted to Fort Jackson in order for the permit application to be considered complete for review and processing,
 - the Submittal Package has been removed from the review process,
 - re-submittal of the Submittal Package with all of the required modifications shall return the application to the review process.
 - Fort Jackson shall hold the incomplete plan for a period of 60 working days from the date of the written notice.
- If an adequate response is not received within 60 working days, the submittal shall be rejected, and the entire submittal process must be initiated again.

If the original Submittal Package does not contain the major required components, it shall be returned to the applicant for re-submittal without review.

3.4.4 Plan Approval and Final Submittal

When the plans have been determined to be in compliance, then the applicant/design professional shall send four (4) additional copies of the Submittal Package to Fort Jackson for final approval to Fort Jackson.

Approved plans remain valid for two (2) calendar years from the date of approval. Extensions or renewals of the approved plans shall be granted by Fort Jackson upon written request by the person responsible for the land disturbing activity.

The Final SWMP shall not be considered approved without an approval stamp with a signature and date on the plans by Fort Jackson. The stamp of approval on the plans is solely an acknowledgement of satisfactory compliance with the requirements of the MOI. The approval stamp does not constitute a warranty to the applicant or any other person concerning safety, appropriateness or effectiveness of any provision, or omission from the Final SWMP.

Approvals of land disturbing activities that were approved prior to the effective date of this Handbook shall remain in effect for the original term of the approval. For land disturbing activities which were not initiated during the original term of approval, the person responsible for the land disturbing activity shall re-submit the Final SWMP to Fort Jackson for review and approval subject to the requirements of this Handbook.

3.4.4.1 Notification of work

The contractor shall provide a written Notification of Work (NOW) to Fort Jackson on the planned commencement of construction a minimum of 48-hours prior to the commencement. See the Section 1.7 for contact information.

A Stop Work Order shall be issued on all projects proceeding without the required NOW approval.

3.5 Construction Requirements

The responsibility and importance of contractors in land disturbance activities should not be overlooked and considered secondary. The contractor's adherence or lack thereof to the approved SWMP is instrumental in the protection of the existing hydrologic and hydraulic features. Several contractor related issues that should be addressed in the SWMP are listed below.

- If necessary, slopes which exceed eight (8) vertical feet should be stabilized with Erosion Control Blankets (ECBs) or Turf Reinforced Mats (TRMs), in addition to hydroseeding. It may be necessary to install temporary slope drains during construction. Temporary berms may be needed daily until the slope is brought to grade
- Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after work has ceased, unless activity in that portion of the site will resume within twenty-one (21) days.
- All sediment and erosion control devices shall be inspected every seven (7) days or after each rainfall occurrence that exceeds one-half (0.5) inch. Damaged or ineffective devices shall be repaired or replaced, as necessary. The contractor shall maintain a log of these inspection reports on site and should send copy of these reports to appropriate Fort Jackson personnel.
- Provide silt fence and/or other control devices, as may be required, to control soil erosion during utility construction. All disturbed areas shall be cleaned, graded, and stabilized with grassing immediately after the utility installation.
- All erosion control devices shall be properly maintained during all phases of construction until the completion of all construction activities and all disturbed areas have been stabilized. Additional control devices may be required during construction in order to control erosion and /or offsite sedimentation. All temporary control devices shall be removed once construction is complete and the site is stabilized.
- The contractor must take necessary action to minimize the tracking of mud onto the paved roadway from construction areas. The contractor shall daily remove mud/soil from pavement, as may be required.

3.5.1 Deviations from Approved Plans

Substantial deviations from the approved site development plans and specifications shall not be made on-site without written approval from Fort Jackson. Realistically and practically, there are always minor variations to the proposed plan during land development activities. These minor variations will be allowable without the need for approval from Fort Jackson, though sound engineering judgement should be exercised in assessing the impacts of these minor changes.

Examples of substantial deviations that would require written approval from Fort Jackson include, but are not limited to the following:

- pipe size changes,
- pipe grade changes that will affect the hydraulic capacity of the storm water facilities,
- the movement of storm water facility that would put them outside of specific easements and right-of-ways, and
- changes in grade on the site which would effect the direction of storm water flows, flow velocities, flow volumes, or other hydrologic impacts that would cause the existing plans to fail in protecting water quantity and water quality impacts.

3.5.2 As-Built Requirements

The permittee shall submit an as-built plan certified by a registered professional to Fort Jackson upon the completion of the construction of the storm water management control structures submitted in the Final SWMP. The registered professional shall certify the following:

- the facilities have been constructed as shown on the as-built plans and
- the facilities meet the approved site plan and specifications or achieve the function they were designed to perform.

Acceptable as-built plans shall be submitted prior to the use or occupancy of site. Fort Jackson may perform a final inspection upon completion of the installation of storm water management structures to determine if the work is completed and constructed in accordance with the Final SWMP.

3.6 Application Fees

Permits authorized by the provisions of this Handbook shall be effective only upon the payment of the appropriate fees, all of which will go to the State. A fee is required for all activities disturbing one acre or more on Fort Jackson. There is no charge for projects that disturb less than one acre. The fee is \$100.00 per disturbed acre, with a \$2000.00 maximum.

Any land disturbing project disturbing one or more acres must obtain either NPDES general permit coverage or an NPDES permit. There is an additional NPDES fee for these projects. There are no exemptions from this fee, therefore State and Federal entities must submit the NPDES fee as part of their Submittal Package. The NPDES fee is \$125.00.

The maximum fee for both is \$2125.00.

3.7 Stormwater Controls: Installation, Inspection, and Maintenance

The post-construction storm water quality control BMPs shall be constructed and implemented in compliance with this Handbook and approved plans that are functioning as intended. Fort Jackson will perform inspections of BMPs to ensure proper functions based on maintenance schedules developed in the SWMP and approved by Fort Jackson. All maintenance activities and inspections shall be the responsibility of Fort Jackson. If inspection reports that the stormwater control is not functioning as expected within one year after construction activities have concluded, the contractor/design professional shall be required to correct the problem. Most deficiencies should be corrected within a short time period, but allowances will be made for more serious problems.

All constructed storm water quality BMPs shall require an as-built certification to ensure proper size and water quality volume. All pre-fabricated storm water quality BMPs shall require a manufacturer's certification that the correct structure is installed properly.

4.0 REFERENCES

ASCE, (1996). *Hydrology Handbook*. ASCE Manuals and Reports of Engineering Practice No. 28.

ASCE & WEF, (1994). *Design and Construction of Urban Stormwater Management Systems*. ASCE Manuals and Reports of Engineering Practice No. 77, WEF Manual of Practice No. FD-20.

American Association of State Highway and Transportation Officials, (1999). “Model Drainage Manual.”

Atlanta Regional Commission, (2001) “Georgia Stormwater Management Manual- Volume 1: Stormwater Policy Guidebook, 1st Edition.

Atlanta Regional Commission, (2001) “Georgia Stormwater Management Manual- Volume 2: Technical Handbook, 1st Edition.

Chow, V.T., Maidment, D., and Mays L., (1988). *Applied Hydrology*. McGraw-Hill, NY.

Haan, C. T., Barfield, B. J., and Hayes, J. C., (1995). *Design Hydrology and Sedimentology for Small Catchments*. Academic Press, San Diego, Ca.

FEMA, (1998). *Federal Guidelines for Dam Safety*. Interagency Committee on Dam Safety, http://www.fema.gov/fima/damsafe/eap_toc.shtm.

Mays, L., (2001). “Hydrology for Drainage System Design and Analysis,” in L. W. Mays, ed., *Storm Water Collection Systems Design Handbook*. McGraw-Hill, NY, p. 1-1 – 1-53.

Paine, J., and Akan, A., (2001). “Design of Detention Systems,” in L. W. Mays, ed., *Storm water Collection Systems Design Handbook*. McGraw-Hill, NY, p. 7-1 – 7-66.

Prince George’s County, (1999a). “Low-Impact Development Design Strategies - An Integrated Design Approach.” Department of Environmental Resources, Programs and Planning Division, Prince George’s County, Maryland.

Prince George’s County, (1999b). “Low-Impact Development Hydraulic Analysis.” Department of Environmental Resources, Programs and Planning Division, Prince George’s County, Maryland.

Richland County, (2001). “Section 4 – Storm Drainage Design Standards.” Richland County Land Development Requirements, Richland County, South Carolina.

South Carolina Department of Health and Environmental Control, (2002). “Stormwater Management and Sediment Control Handbook for Land Disturbance Activities.” Prepared by the Bureau of Water and OCRM.

Schueler, T. R. (1987). "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs," Metropolitan Washington Council of Governments.

Shwab, Glenn O. and Richard K. Frevert, (1985). *Elementary Soil and Water Engineering*. John Wiley & Sons, New York, New York.

United States Department of Agriculture, (1986). "Urban Hydrology for Small Watersheds." *Technical Release No. 55*, 2nd Edition, Natural Resources Conservation Service, Conservation Engineering Division, Washington D.C.

United States Department of the Army and the Air Force, (1991). "Drainage and Erosion Control Structures for Airfields and Heliports". US Army Technical Manual # 5-280-3/ US Air Force Manual # 88-5, Chap. 3.

United States Department of the Army and the Air Force, (1987a). "Surface Drainage Facilities for Airfields and Heliports". US Army Technical Manual # 5-820-1/ US Air Force Manual # 88-5, Chap. 1.

United States Department of the Army and the Air Force, (1987b). "Drainage for Areas Other Than Airfields". US Army Technical Manual #5-8204/ US Air Force Manual # 88-5, Chap 4.

United States Department of the Army, Army Corps of Engineers, (1999). "Design Policy for Military Construction." Engineering Regulation # 1110-345-100.

United States Department of the Army, Army Corps of Engineers, (1999). "Engineering and Design for Civil Works Projects." Engineering Regulation # 1110-2-1150.

United States Department of Transportation, (1996). "Highway Hydrology – Hydraulic Design Series # 2." Federal Highway Administration, Publication # FHWA-SA-96-067.

United States Department of Transportation, (2001). "Introduction to Highway Hydrology – Hydraulic Design Series # 4." Federal Highway Administration, Publication # FHWA NHI 01-019.

United States Department of Transportation, (2001a). "Hydraulic Design of Highway Culverts – Hydraulic Design Series # 5." Federal Highway Administration, Publication # FHWA-NHI-01-020.

United States Department of Transportation, (2001b). "Urban Drainage Design Manual – Hydraulic Engineering Circular # 22." Federal Highway Administration, Publication # FHWA-NHI-01-021.

Urban Drainage and Flood Control District, (2003). *Urban Storm Drainage Criteria Manual*, Volume III. Denver, CO.

WEF & ASCE, (1998). *Urban Runoff Quality Management*, WEF Manual of Practice No. 23, ASCE Manual and Report on Engineering Practice No. 87.

Yen, B., (2001). "Hydraulics of Sewer Systems," in L. W. Mays, ed., *Storm Water Collection Systems Design Handbook*. McGraw-Hill, NY, p. 6-1 – 6-113.

APPENDIX A

MEMORANDUM OF INSTRUCTION

NOT USED

APPENDIX B

FORT JACKSON LAND DISTURBANCE APPLICATION FORM



United States Army Training Center Fort Jackson, South Carolina

POC in DLE, PSES is:
Doyle Allen
(803)751-7232
allend@jackson.army.mil

APPLICATION FORM FOR LAND DISTURBING ACTIVITIES FORT JACKSON, SOUTH CAROLINA

DA, HQ, USATC & Fort Jackson
ATZJ-DLE-ENRD (Doyle Allen)
2563 Essayons Way
Fort Jackson, SC 29207-5670

PROJECT NAME _____ DATE: _____

APPLICANT (organization requesting the project) _____

POC _____ TELEPHONE _____ Email: _____

LOCATION (also show on a location map) _____

ORGANIZATION RESPONSIBLE FOR IMPLEMENTING STORMWATER/EROSION CONTROL PLAN (this could be Roads and Grounds, Corps of Engineers, National Guard Engineering unit, private contractor, etc. - whoever will be constructing stormwater and erosion control measures)

ORGANIZATION _____

POC _____ TELEPHONE _____ Email: _____

WHO WILL BE RESPONSIBLE FOR SITE INSPECTION? (this should be the field person the PSES inspector can call if there is a problem - the person directing the day to day activities of the project; this might be a Corps of Engineers project manager, a Job Order Contract (JOC) inspector, or someone from Roads and Grounds)

POC _____ TELEPHONE _____ E-mail _____

CONTRACTOR OR OPERATOR (if known) _____

POC _____ TELEPHONE _____ E-mail: _____

TOTAL ACRES OF LAND DISTURBANCE _____

FEE FOR LAND DISTURBANCES OF 5 ACRES OR GREATER, A \$125 NPDES ADMINISTRATION FEE IS REQUIRED (payable to South Carolina Department of Health and Environmental Control (DHEC), ATTN: Harvey Daniel, 2600 Bull Street, Columbia, SC 29201)

ANTICIPATED: START DATE _____ COMPLETION DATE _____

Attach Stormwater Management and Sediment Reduction Plan/Pollution Prevention Plan

(HIGHLIGHTED AREAS TO BE FILLED IN BY PSES STAFF)

Record of Environmental Consideration (REC) Number _____

NEAREST RECEIVING WATERBODY _____

DISTANCE TO NEAREST RECEIVING WATERBODY _____

LATITUDE _____ LONGITUDE _____ SIC CODE _____

Any wetlands on the project site? _____ If so, delineate on a map. USGS Topo _____

I hereby certify that all land disturbing construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans. I also certify that a responsible person will be assigned to the project for day to day control. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting **false information, including the possibility of fine and imprisonment for knowing violations**

(To be signed by a person who is financially responsible and/or who has the authority to ensure that the stormwater/erosion control plan is implemented. Design engineers may not sign here. Contractors should sign a Co-permittee Agreement)

PRINTED NAME

SIGNATURE

DESIGNER CERTIFICATION (as applicable) – One copy of the plans, all specifications and supporting calculations, forms, and reports are herewith submitted and made a part of this application. I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of Title 48, Chapter 14 of the Code of Laws of SC, 1976 as amended, and pursuant regulation 72-300.

SIGNATURE

PRINTED NAME

SC REGISTRATION NUMBER

Engineer ☐ Tier b land surveyor ☐ Landscape architect ☐ Federal government employee ☐

FOR INTERNAL USE ONLY

I hereby certify that I have thoroughly reviewed the application, plans and supporting documents and found them to be in compliance with the letter and the intent of the law. This stamp of approval on the plans is solely an acknowledgement of satisfactory compliance with the requirements of these regulations. The approval stamp does not constitute a representation or warranty to the applicant or any other person concerning the safety, appropriateness of effectiveness of any provisions, or omission from the stormwater and sediment plan.

FJ PLAN REVIEWER

FJ HYDROLOGY REVIEWER

APPENDIX C

FORT JACKSON LAND DISTURBANCE SUBMITTAL SUMMARY FORM

DATE:

Fort Jackson Land Disturbance Handbook Submittal Summary Form

The purpose of this document is to provide reviewers from Fort Jackson's DLE-ENRD and SCDHEC with a summary of the proposed land disturbance activities and the design process. When necessary, all information provided in this summary should be substantiated with detailed calculations.

I. General Information

Project Name:	
Company Name:	
Engineer (P.E.) Name:	
Project Narrative:	
Description of Existing Drainage Patterns:	
Description of Proposed Drainage Patterns:	
Completed SCDHEC land disturbance application forms:	<input type="checkbox"/>
2 complete sets of construction documents:	<input type="checkbox"/>
Payment for all necessary fees:	<input type="checkbox"/>
Location map(s) of project (should include necessary FIRMs):	<input type="checkbox"/>
Topographic map of project:	<input type="checkbox"/>
Wetlands delineation on construction documents:	<input type="checkbox"/>
Detention waiver:	<input type="checkbox"/>
Identification of all other above and below ground utilities:	<input type="checkbox"/>

II. Watershed Information

Add a watershed

Delete a watershed

Watershed ID	Watershed area (ac)	Soil Type(s)	Land use(s)	Area-weighted Runoff factor (CN/C)	Time of concentration (min)
Pre-Development Conditions					

Add a watershed

Delete a watershed

Post-Development Conditions					

Methodology used:	
Models used:	

III. Hydrologic Information

Add a watershed

Delete a watershed

Watershed ID	First-flush (cfs)	2-yr peak runoff (cfs)	10-yr peak runoff (cfs)	25-yr peak runoff (cfs)	100-yr peak runoff (cfs)
Pre-Development flows					

Add a watershed

Delete a watershed

Post-Development flows					

Methodology used:	
Model(s) used:	

VI. Storm Sewer Design Information

Add a watershed

Delete a watershed

Design Point ID	Rim elevation (MSL ft)	Flow rate into pipe (cfs)	Pipe Diameter (in)	Invert in (MSL ft)	Invert out (MSL ft)	Pipe length (ft)	Pipe Slope (ft/ft)	Flow Velocity (fps)	HGL

Methodology used:	
Model(s) used:	

V. Channel Design Information

Add a structure

Delete a structure

Structure ID	Flow rate (cfs)	Manning's n	Channel Slope (ft/ft)	Left Side Slope (ft/ft)	Right Side Slope (ft/ft)	Channel length (ft)	Velocity (ft/s)

Methodology used:	
Model(s) used:	

VI. Erosion Prevention & Sediment Control Design Information

Add a structure

Delete a structure

Structure ID	Type	Effective Area (ft ²)	Purpose	% TSS removal

Methodology used:	
Model(s) used:	

VII. Detention/Retention Facility Design Information

Add a Structure

Add a stage

Delete a stage

Structure ID	Stage (ft)	Surface Area (ft ²)	Storage (ac-ft)	Discharge (cfs)	WQCV (ft ³)	WQ Discharge (cfs)	Outlet Type

Methodology used:	
Model(s) used:	

VIII. Water Quality/BMP Design Information

Add a BMP

Delete a BMP

Structure ID	Volume (ft ³)	Pollutant #1	% removal	Pollutant #2	% removal	Other Pollutants	% removal(s)

Methodology used:	
Model(s) used:	

IX. Culverts

Add a structure

Delete a structure

Structure ID	Flow rate in pipe (cfs)	Height * Width (in)	Invert in (MSL ft)	Invert out (MSL ft)	Culvert length (ft)	Flow Velocity (fps)	Material and Class	Wing-wall (Y/N)	Head-wall (Y/N)

Methodology used:	
Model(s) used:	

X. Maintenance Schedules

Add a structure

Delete a structure

Structure ID	Activity #1	Frequency (#/yr)	Activity #2	Frequency (#/yr)	Activity #3	Frequency (#/yr)

APPENDIX D

BMP USAGE GUIDANCE

EROSION PREVENTION BMP SUGGESTED USES

BMP	Design Manual Section	Slope Protection	Waterway Protection	Surface Protection	Enclosed Drainage	Large Flat Areas	Borrow Areas	Adjacent Properties
Erosion Prevention Measures	8.4	X	X	X	X	X	X	X
Surface Roughening	8.4.1	X		X				
Bench Terracing	8.4.2	X		X				
Temporary Seeding	8.4.3	X		X		X	X	X
Mulching	8.4.4	X				X	X	
Erosion Control Blankets and Turf Reinforcement Mats	8.4.5	X	X	X			X	
Final Stabilization	8.4.6	X		X		X		X
Topsoiling	8.4.6.1			X		X		
Permanent Seeding and Planting of Grasses	8.4.6.2	X		X		X		X
Permanent Ground Cover Plants	8.4.6.3	X		X				X
Sodding	8.4.6.4	X		X		X		X
Riprap or Aggregate	8.4.7	X	X	X				
Outlet Protection	8.4.8		X		X			X
Dust Control	8.4.9					X	X	X
Polyacrylamide (PAMs)	8.4.10	X		X	X	X	X	X

TEMPORARY SEDIMENT CONTROL BMP SUGGESTED USES

BMP	Design Manual Section	Slope Protection	Waterway Protection	Surface Protection	Enclosed Drainage	Large Flat Areas	Borrow Areas	Adjacent Properties
Temporary Sediment Control Structures	8.5	X	X	X	X	X	X	X
Storage Volumes and Maintenance Schedules	8.5.1		X		X			X
Temporary Sediment Basin	8.5.2		X	X	X			X
Multipurpose Basin	8.5.3		X	X	X			X
Temporary Sediment Trap	8.5.4		X	X				X
Silt Fence	8.5.5	X	X					X
Rock Ditch Check	8.5.6			X				X
Stabilized Construction Entrance	8.5.7					X		X
Storm Drain Inlet Protection	8.5.8		X		X			X
Vegetated Filter Strips	8.5.9		X					X
Rock Sediment Dike	8.5.10		X	X				X

RUNOFF CONTROL AND CONVEYANCE BMP SUGGESTED USES

BMP	Design Manual Section	Slope Protection	Waterway Protection	Surface Protection	Enclosed Drainage	Large Flat Areas	Borrow Areas	Adjacent Properties
Pipe Slope Drains	8.6.1	X		X				
Temporary Stream Crossing	8.6.2		X	X				X
Runoff Conveyance Measures	8.6.3	X					X	X
Construction De-watering	8.6.4		X		X	X	X	
Level Spreader	8.6.5			X		X		X
Subsurface Drains	8.6.6			X		X		

STRUCTURAL STORMWATER QUALITY BMP SUGGESTED USES

BMP	Design Manual Section	Land Requirement	Single Family	Multi Family	Low Density Commercial	High Density Commercial	Low Density Industrial	High Density Industrial
Wet Storm Water Ponds	9.8.1.2	MODERATE - HIGH	X	X	X	X	X	X
Wet Extended Pond	9.8.1.2	MODERATE - HIGH	X	X	X	X	X	X
Micropool Extended Pond	9.8.1.2	MODERATE - HIGH	X	X	X	X	X	
Shallow Wetland	9.8.1.3	MODERATE - HIGH	X	X	X		X	
Extended Detention Shallow Wetland	9.8.1.3	MODERATE - HIGH	X	X	X		X	
Pond/Wetland System	9.8.1.3	MODERATE - HIGH	X	X	X		X	
Pocket Wetland	9.8.1.3	MODERATE	X	X		X		X
Bioretention Areas	9.8.1.4	MODERATE	X	X	X	X	X	X
Sand Filtration Facilities	9.8.1.5	LOW			X	X	X	X
Infiltration Trenches	9.8.1.6	MODERATE	X	X	X	X	X	X
Enhanced Dry Swales	9.8.1.7	HIGH	X	X	X		X	
Pre-Fabricated Control Devices	9.8.1.8	LOW		X	X	X	X	X

Fort Jackson
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STRUCTURAL STORMWATER QUALITY BMP CHARACTERISTICS

BMP	Design Manual Section	Maintenance Burden	Costs	Aesthetically Pleasing	Provide Habitat	Drainage Area (Acres)	Soils
Wet Storm Water Pond	9.8.1.2	LOW	LOW	X	X	10 MIN 25 PREFERRED	HSG A SOILS MAY REQUIRE POND LINER
Wet Extended Pond with Aquatic Bench	9.8.1.2	LOW	LOW	X	X	10 MIN 25 PREFERRED	HSG B SOILS MAY REQUIRE INFILTRATION TESTING
Micropool Extended Pond	9.8.1.2	MODERATE	LOW	X	X	10 MIN	
Shallow Wetland	9.8.1.3	MODERATE	MODERATE	X	X	20 MIN	
Extended Detention Shallow Wetland	9.8.1.3	MODERATE	MODERATE	X	X	20 MIN	HSG A AND B SOILS MAY REQUIRE LINER
Pond/Wetland System	9.8.1.3	MODERATE	MODERATE	X	X	20 MIN	
Pocket Wetland	9.8.1.3	HIGH	MODERATE	X	X	5 MIN	
Bioretention Areas	9.8.1.4	LOW	MODERATE	X	X	5 MAX	CLAY OR SILTY SOILS MAY REQUIRE PRETREATMENT
Sand Filtration Facilities	9.8.1.5	HIGH	HIGH			5 MAX 2 PREFERRED	
Infiltration Trenches	9.8.1.6	HIGH	HIGH			5 MAX	INFILTRATION RATE > 0.5 IN/HR
Enhanced Dry Swales	9.8.1.7	LOW	MODERATE			5 MAX	PERMEABLE SOIL
Pre-Fabricated Control Devices	9.8.1.8	HIGH	HIGH	X (HIDDEN)		VARIES	NO REQUIREMENT

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STRUCTURAL STORMWATER QUALITY BMP SUGGESTED USES

BMP	Design Manual Section	Water Quality	Channel Protection	Flood Protection	TSS Removal	Nutrient Removal	Metal Removal	Bacterial Removal
Wet Stormwater Pond	9.8.1.2	X	X	X	HIGH	MODERATE	MODERATE	MODERATE
Wet Extended Pond with Aquatic Bench	9.8.1.2	X	X	X	HIGH	HIGH	MODERATE	MODERATE
Micropool Extended Pond	9.8.1.2	X	X	X	HIGH	MODERATE	MODERATE	NO DATA
Shallow Wetland	9.8.1.3	X	X	X	HIGH	HIGH	MODERATE	HIGH
Extended Detention Shallow Wetland	9.8.1.3	X	X	X	HIGH	HIGH	MODERATE	HIGH
Pond/Wetland System	9.8.1.3	X	X	X	HIGH	HIGH	MODERATE	HIGH
Pocket Wetland	9.8.1.3	X	X		HIGH	HIGH	MODERATE	HIGH
Bioretention Areas	9.8.1.4	X			HIGH	MODERATE	MODERATE	NO DATA
Sand Filtration Facilities	9.8.1.5	X			HIGH	MODERATE	MODERATE	MODERATE
Infiltration Trenches	9.8.1.6	X			HIGH	MODERATE	HIGH	HIGH
Enhanced Dry Swales	9.8.1.7	X			HIGH	MODERATE	MODERATE	LOW
Pre-Fabricated Control Devices	9.8.1.8	X			HIGH	LOW-HIGH	LOW-HIGH	LOW-HIGH

APPENDIX E

FORT JACKSON SOIL MAP

Fort Jackson
Soils Codes and Hydrologic Soil Groupings



APPENDIX F

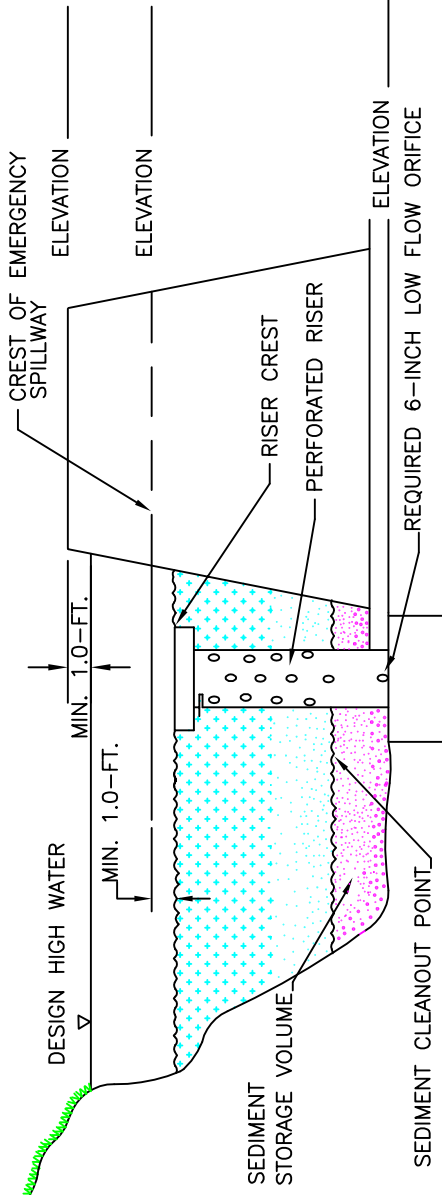
STANDARD DRAWINGS

LIST OF DRAWINGS

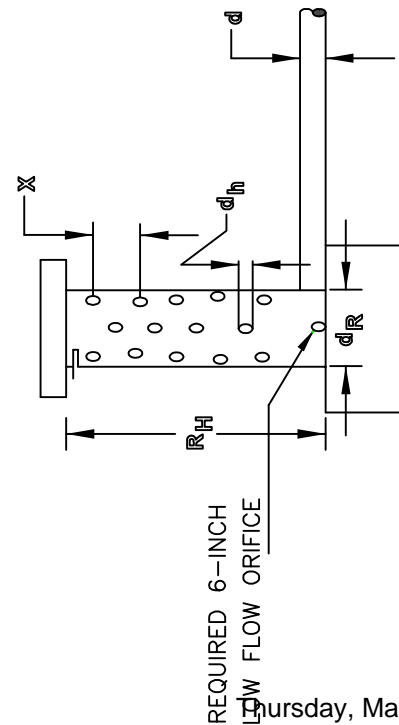
Drawing Title

EC-01	Sediment Basin (2 sheets)
EC-02	Sediment Trap (2 sheets)
EC-04	Reinforced Silt Fence (3 sheets)
EC-05	Rock Ditch Check (2 sheets)
EC-06	Stabilized Construction Entrance (3 sheets)
EC-07	Excavated Drop Inlet Protection (2 sheets)
EC-08	Block and Gravel Drop Inlet Sediment Trap (2 sheets)
EC-09	Gravel and Wire Mesh Drop Inlet Protection (2 sheets)
EC-10	Block and Gravel Curb Inlet Protection
EC-11	Gravel Curb Inlet Protection with Sediment Filter
EC-12	Curb Inlet Protection with Wooden Weir
EC-13	Rock Sediment Dike (3 sheets)
EC-14	Pipe Slope Drain (2 sheets)
EC-15	Temporary Stream Low Water Crossing (3 sheets)
EC-16	Diversion Dike or Berm (2 sheets)
EC-17	Diversion Swale (2 sheets)
EC-18	Sandbags
EC-19	Inlet protection socks
EC-20	Sock fence
EC-21	Filter Fabric
SD-01	Anti Vortex
SD-02	Pipe Channel Outlet (2 sheets)
WQ-01	Wet Detention Pond (2 sheets)
WQ-02	Wet Extended Detention Pond (2 sheets)
WQ-03	Micropool Extended Detention Pond (2 sheets)
WQ-04	Storm Water Wetland (2 sheets)
WQ-05	Shallow Wetland (2 sheets)
WQ-06	Extended Detention Shallow Wetland (2 sheets)
WQ-07	Pond/Wetland System (2 sheets)
WQ-08	Pocket Wetland (2 sheets)

WQ-09	Typical Bioretention Area (4 sheets)
WQ-10	Underground Sand Filter (2 sheets)
WQ-11	Infiltration Trench (2 sheets)
WQ-12	Enhances Dry Swale (2 sheets)
WQ-13	LID Parking Lot
WQ-14	BMP Standard Notes



DESIGN ELEVATIONS WITH REQUIRED EMERGENCY SPILLWAY



R_H = RISER HEIGHT

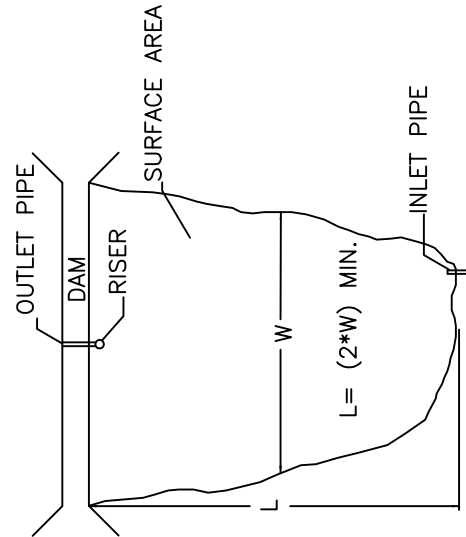
d_R = RISER DIAMETER

d_h = ORIFICE DIAMETER

X = ORIFICE SPACING

d = OUTLET PIPE DIAMETER

RISER PIPE DETAIL



PLAN VIEW



Fort Jackson
Land Disturbance Handbook

SEDIMENT BASIN

SEDIMENT BASIN

When and Where to Use It

Sediment Basins should not be placed in waters of the State or USGS blue-line streams (unless approved by Fort Jackson, State, or Federal authorities).

Inspection and Maintenance:

The key to a functional sediment basin is continual monitoring, regular maintenance and regular sediment removal.

The length to width ratio should be followed. Baffles created from berms or silt fences should be used to obtain a L:W ratio of at least 2.

Attention to sediment accumulations within the pond is extremely important. Sediment deposition should be continually monitored in the basin. Owners and maintenance authorities should be aware that significant concentrations of heavy metals (e.g., lead, zinc, and cadmium) as well as some organics such as pesticides, may be expected to accumulate at the bottom of these treatment facilities.

Remove sediment when it reaches 50% of storage volume or top of the cleanout stake.

Since decomposing vegetation can release pollutants, especially nutrients, captured in the wetpond, it may be necessary to harvest dead vegetation annually. Otherwise the decaying vegetation can export pollutants out of the pond and can cause nuisance conditions to occur.

Regular inspections should be done every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation.

All temporary sediment basins should be removed within 30 days after final site stabilization is achieved or after it is no longer needed.

Trapped sediment should be removed from, or stabilized on site.

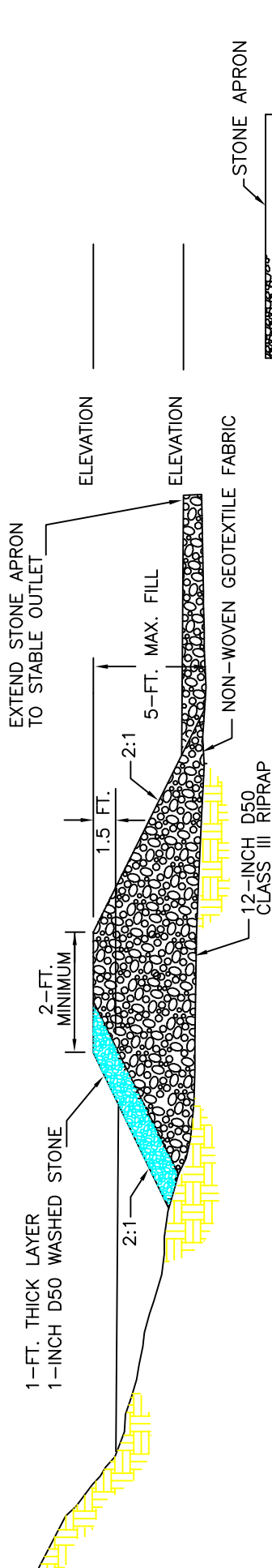
Disturbed areas resulting from the removal of the sediment basin should be permanently stabilized.



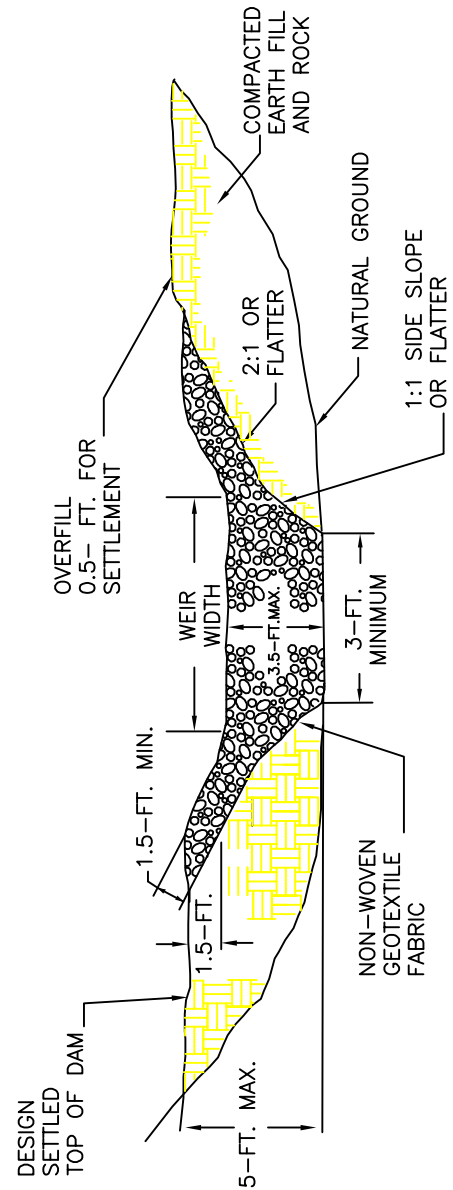
Fort Jackson
Land Disturbance Handbook

SEDIMENT BASIN

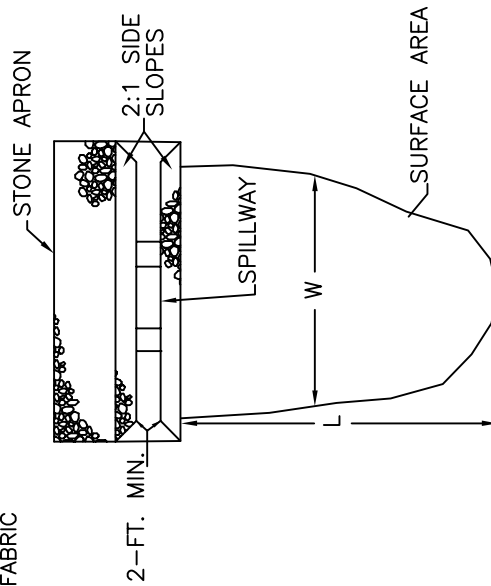
STANDARD DRAWING NO. EC-01 Page 2 of 2



STONE SECTION



EMBANKMENT AND SPILLWAY ELEVATION



$$L = (2*W) \text{ MIN.}$$

PLAN VIEW



**Fort Jackson
Land Disturbance Handbook**

SEDIMENT TRAP

STANDARD DRAWING NO. EC-02 Page 1 of 2

SEDIMENT TRAP

When and Where to Use It

Sediment traps should not be placed in waters of the State or USGS blue-line streams (unless approved by Fort Jackson, State, or Federal authorities).

Installation:

Rock Outlet Structure Requirements:

The maximum sediment trap height shall be 5—feet.
 The maximum stone height of the outlet weir shall be 3.5—feet.
 The minimum bottom flow width of the structure shall be 3—feet.
 The minimum top flow length of the structure shall be 2—feet.

The main body of the outlet structure shall consist of 12—inch D50 class III riprap. The upstream face of the outlet structure shall consist of a 1—foot thick layer of 1—inch D50 washed stone. The maximum sideslope of the rock structure shall be 2:1.

Install a non—woven geotextile filter fabric before installing the stone for the outlet structure. Allow the stone to extend downstream past the toe of the embankment. Geotextile filter fabric shall conform to the specifications.

All inside sediment trap slopes should be 3:1 or flatter.

Mark the sediment cleanout level of trap with a stake in the field. Seed and mulch all disturbed areas.

Inspection and Maintenance:

The key to a functional sediment trap is continual monitoring, regular maintenance and regular sediment removal.

Remove sediment when it reaches 50% of storage volume or reaches the top of cleanout stake.

Regular inspections should be done every seven (7) calendar days and within 24—hours after each rainfall event that produces ½—inch or more of precipitation.

All temporary sediment traps should be removed within 30 days after final site stabilization is achieved or after it is no longer needed.

Trapped sediment should be removed from, or stabilized on site.

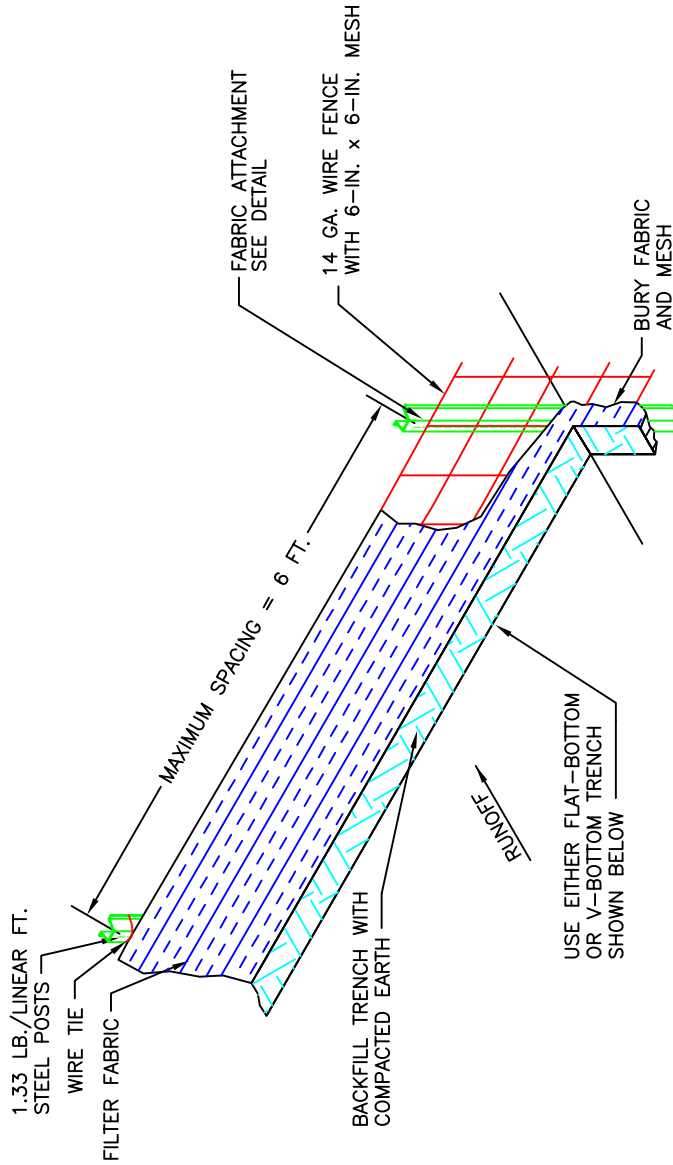
Disturbed areas resulting from the removal of the sediment trap should be permanently stabilized.



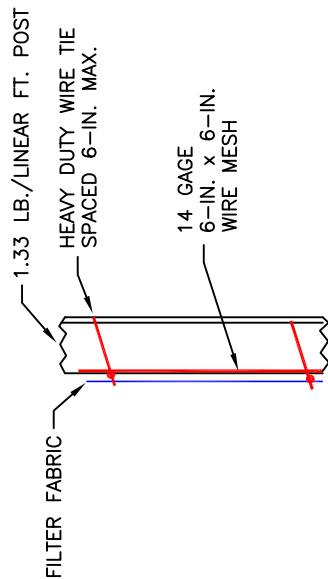
Fort Jackson
Land Disturbance Handbook

SEDIMENT TRAP

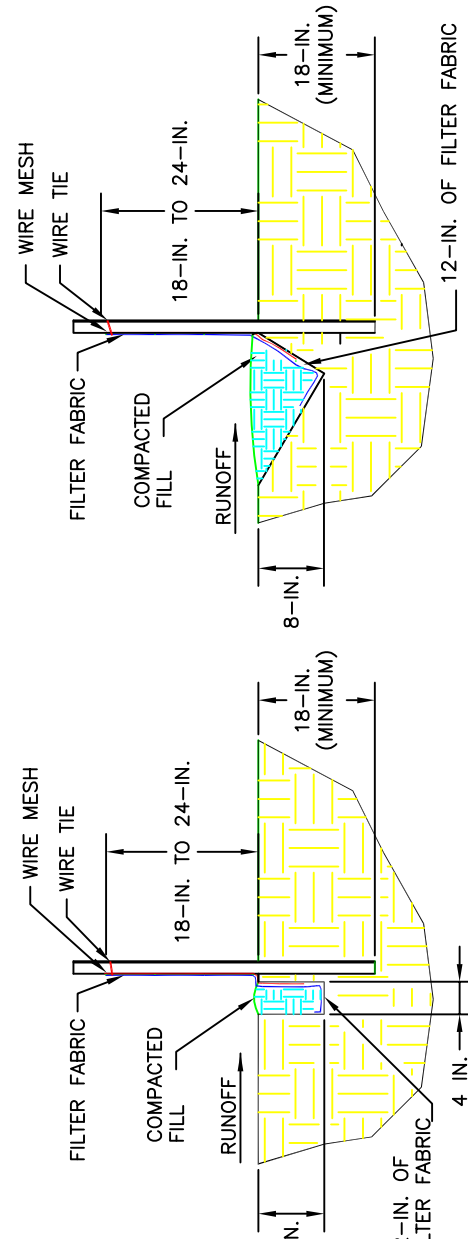
STANDARD DRAWING NO. EC-02 Page 2 of 2



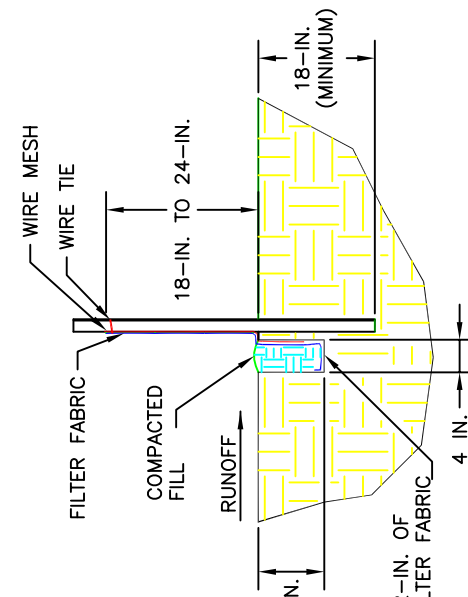
SILT FENCE INSTALLATION



FABRIC ATTACHMENT DETAIL



V-SHAPED TRENCH DETAIL



FLAT-BOTTOM TRENCH DETAIL



Fort Jackson
Land Disturbance Handbook

REINFORCED SILT FENCE

STANDARD DRAWING NO. EC-04 Page 1 of 3

REINFORCED SILT FENCE

Installation:

The fence should be placed at all fill slopes and soil berms or where the disturbed area that is no more than $\frac{1}{4}$ acre per 100 feet of fabric. The fence shall run across the slope along a line of uniform elevation (perpendicular to the direction of flow). The fence should be located at least 10-feet from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.

A flat-bottom trench approximately 4-inches wide and 8-inches deep, or a V-shaped trench 8-inches deep should be excavated.

Place 12-inches of specified filter fabric into the 8-inch deep trench, extending the remaining 4-inches towards the up-slope side of the trench.

Extend the 6-inch by 6-inch 14-gage wire mesh into the trench a minimum depth of 8-inches.

Backfill the trench with soil or gravel and compact. Mechanical compaction should be performed as necessary to ensure proper functioning of the fence and posts.

On the downslope side of the trench, drive the 1.33 lb./linear foot steel posts at least 18-inches into the ground, spacing them no further than 6-feet apart.

Posts should be installed, with 1- to 2-inches of the post protruding above the top of the fabric and no more than 36-inches of the post should protrude above the ground. The minimum fence height (height of filter fabric) above grade shall be 18-inches. The maximum fence height (height of filter fabric) above grade shall be 24-inches.

Filter fabric should be purchased in a continuous roll and cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter fabric should be wrapped together only at a support post with both ends securely fastened to the post, with a minimum 6-inch overlap. Only those filter fabrics that meet the specifications detailed by Fort Jackson shall be used.

Heavy duty wire ties spaced a maximum of 6-inches apart, should be used to attach the fabric and wire mesh to the steel posts.



Fort Jackson
Land Disturbance Handbook

REINFORCED SILT FENCE

STANDARD DRAWING NO. EC-04 Page 2 of 3

REINFORCED SILT FENCE

Inspection and Maintenance:

Inspect silt fence every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Check for areas where runoff has eroded a channel beneath the fence, or where the fence was caused to sag or collapse by runoff overtopping the fence.

If the fence fabric tears, begins to decompose, or in any way becomes ineffective, replace the affected section of fence immediately.

Sediment must be removed when it reaches approximately $\frac{1}{3}$ the height of the fence, especially if heavy rains are expected.

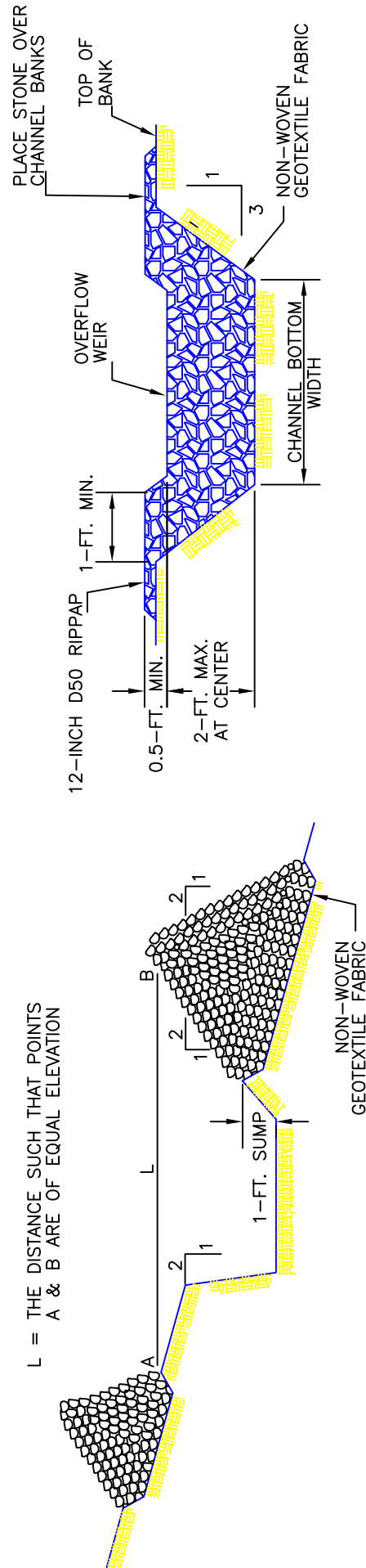
Reinforced silt fence should be removed within 30 days after final site stabilization is achieved or after temporary BMPs are no longer needed. Trapped sediment should be removed or stabilized on site. Disturbed areas resulting from fence removal shall be permanently stabilized.



Fort Jackson
Land Disturbance Handbook

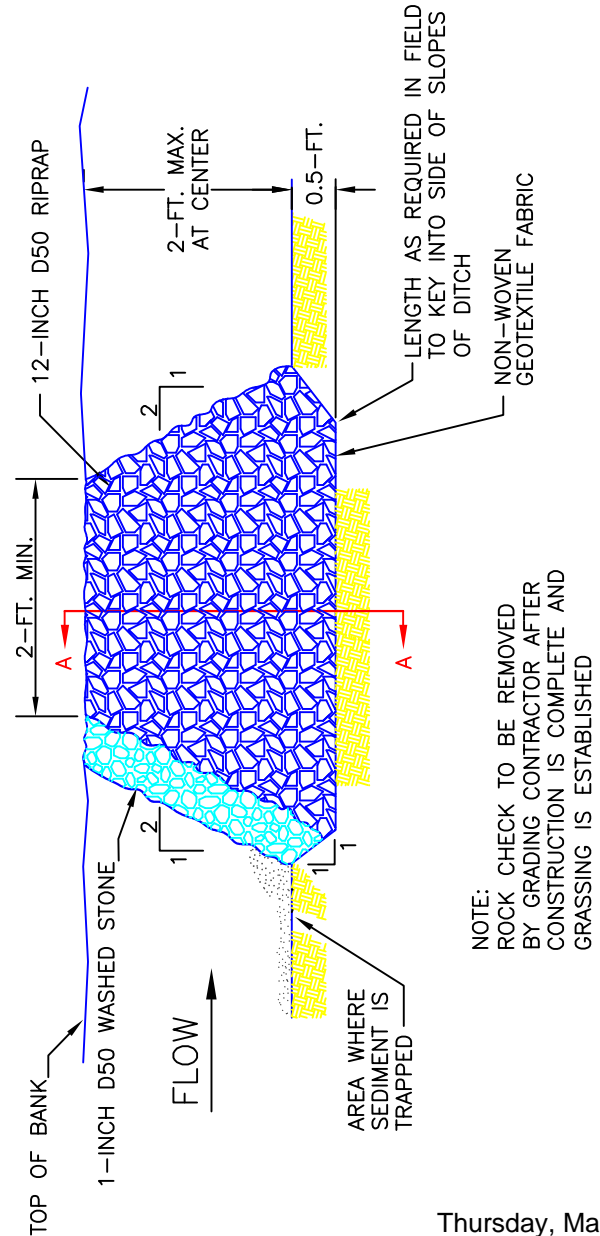
REINFORCED SILT FENCE

STANDARD DRAWING NO. EC-04 Page 3 of 3



SPACING BETWEEN DITCH CHECK

CROSS SECTION A-A THRU STONE DITCH CHECK



NOTE:
ROCK CHECK TO BE REMOVED
BY GRADING CONTRACTOR AFTER
CONSTRUCTION IS COMPLETE AND
GRASSING IS ESTABLISHED

TYPICAL DITCH CHECK SECTION



Fort Jackson
Land Disturbance Handbook

ROCK DITCH CHECK

STANDARD DRAWING NO. EC-05 Page 1 of 2

ROCK DITCH CHECK

When and Where to Use It

A rock ditch check should be installed in steeply sloped swales, or in swales where adequate vegetation cannot be established. Rock ditch checks should be used only in small open channels. Rock ditch checks should not be placed in waters of the State or US or as designated by USGS topographical blue-line streams.

Installation:

A non-woven geotextile fabric shall be installed over the soil surface where the rock ditch check is to be placed. The geotextile fabric shall conform to Fort Jackson specifications. The body of the rock ditch check shall be composed of 12-inch D50 Riprap.

The upstream face of the rock ditch check may be composed of 1-inch D50 washed stone.

Rock ditch checks should not exceed a height of 2-feet at the centerline of the channel.

Rock ditch checks should have a minimum top flow length of 2-feet.

Stone should be placed over the channel banks to prevent water from cutting around the ditch check.

The rock must be placed by hand or mechanical placement (no dumping of rock to form dam) to achieve complete coverage of the ditch or swale and to ensure that the center of the check is lower than the edges.

The maximum spacing between the dams should be such that the toe of the upstream check is at the same elevation as the top of the downstream check.

Inspection and Maintenance:

Inspect rock ditch checks every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Inspect for sediment and debris accumulation. Inspect ditch check edges for erosion and repair promptly as required.

Sediment should be removed when it reaches $\frac{1}{3}$ the original check height.

In the case of grass-lined ditches and swales, rock ditch checks should be removed when the grass has matured sufficiently to protect the ditch or swale unless the slope of the swale is greater than 4%.

After construction is complete, all stone should be removed by the grading contractor if vegetation will be used for permanent erosion control measures.

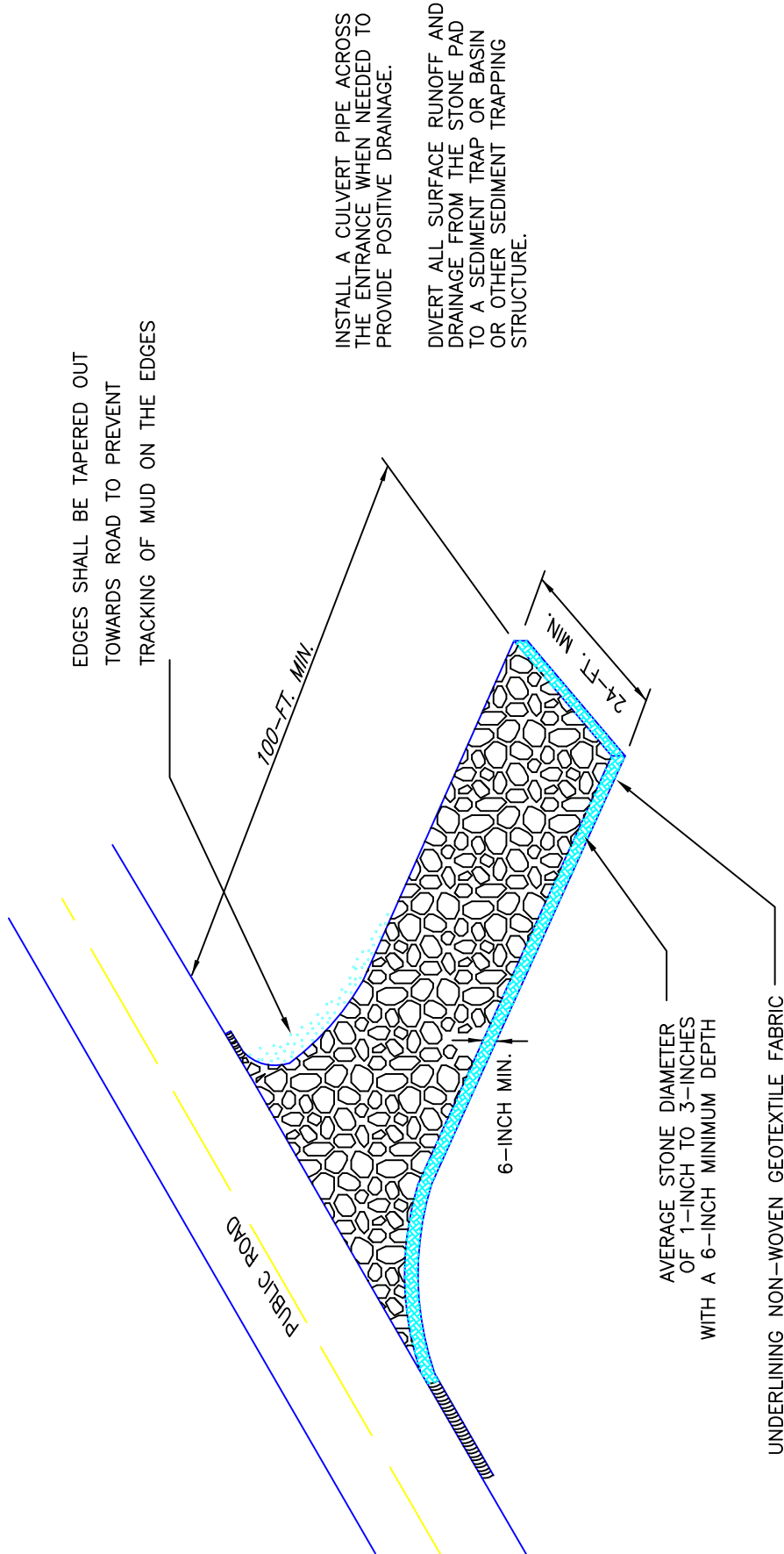
The area beneath the rock ditch checks should be seeded and mulched immediately after rock check dam removal.



**Fort Jackson
Land Disturbance Handbook**

ROCK DITCH CHECK

STANDARD DRAWING NO. EC-05 Page 2 of 2



Fort Jackson
Land Disturbance Handbook

STABILIZED CONSTRUCTION ENTRANCE

STANDARD DRAWING NO. EC-06 Page 1 of 3

STABILIZED CONSTRUCTION ENTRANCE

When and Where to Use It

Stabilized construction entrances should be used at all points where traffic will be leaving a construction site and moving directly onto a public road.

Important Considerations

If washing is used, provisions must be made to intercept the wash water and trap the sediment before it is carried offsite. Washdown facilities shall be required as directed by Fort Jackson personnel as needed. Washdown areas in general must be established with crushed gravel and drain into a sediment trap or sediment basin. Construction entrances should be used in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by vehicles.

Installation:

Remove all vegetation and any objectionable material from the foundation area.

Divert all surface runoff and drainage from stones to a sediment trap or basin.

Install a non-woven geotextile fabric prior to placing any stone. The geotextile fabric shall conform to Fort Jackson specifications.

Install a culvert pipe across the entrance when needed to provide positive drainage.

The entrance shall consist of 1-inch to 3-inch D50 stone placed at a minimum depth of 6-inches.

Minimum dimensions of the entrance shall be 24-feet wide by 100-feet long, and may be modified as necessary to accommodate site constraints.

The edges of the entrance shall be tapered out towards the road to prevent tracking of mud at the edge of the entrance.



STABILIZED CONSTRUCTION ENTRANCE

Inspection and Maintenance:

Inspect construction entrances every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation, or after heavy use. Check for mud and sediment buildup and pad integrity. Make daily inspections during periods of wet weather. Maintenance is required more frequently in wet weather conditions. Reshape the stone pad as needed for drainage and runoff control.

Wash or replace stones as needed and as directed by the inspector. The stone in the entrance should be washed or replaced whenever the entrance fails to reduce mud being carried off-site by vehicles. Frequent washing will extend the useful life of stone.

Immediately remove mud and sediment tracked or washed onto public roads by brushing or sweeping. Mud and sediment should not swept or brushed into inlets. Flushing should only be used when the water can be discharged to a sediment trap or basin.

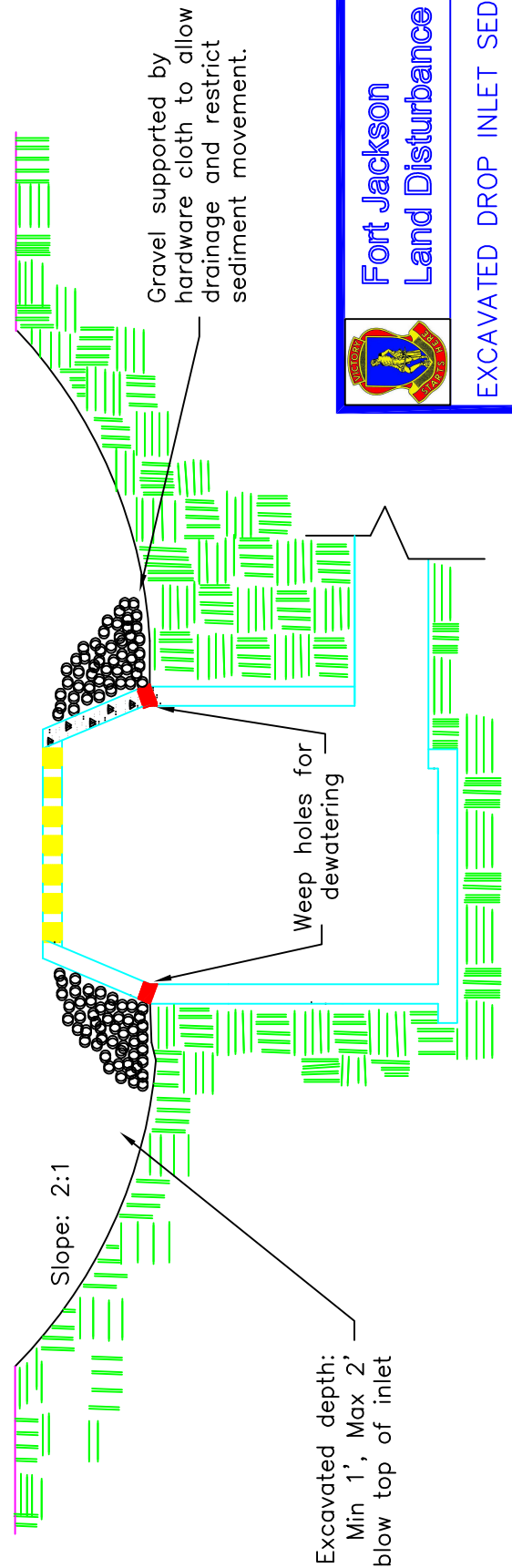
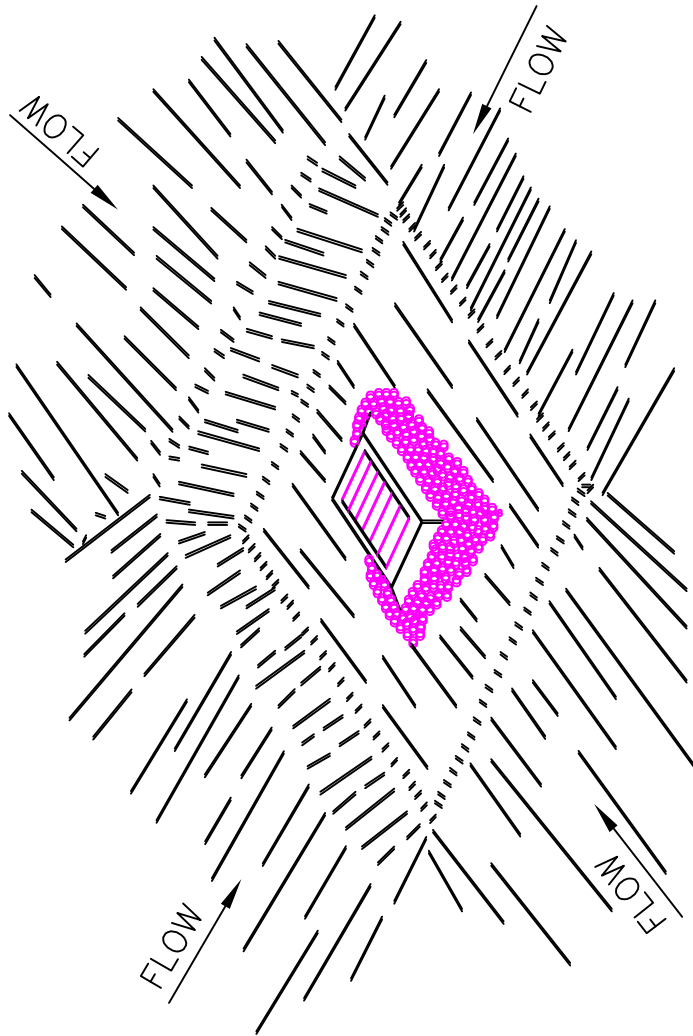
Repair any broken pavement immediately.



Fort Jackson Land Disturbance Handbook

STABILIZED CONSTRUCTION ENTRANCE

STANDARD DRAWING NO. EC-06 Page 3 of 3



**Fort Jackson
Land Disturbance Handbook**

EXCAVATED DROP INLET SEDIMENT TRAP

STANDARD DRAWING NO. EC-07 Page 1 of 2

EXCAVATED DROP INLET SEDIMENT TRAP

This type of inlet protection is applicable where heavy flows are expected and where overflow capability and ease of maintenance are desired.

Installation:

Clear area prior to excavation. Grade area uniformly around the basin.

Excavate as described. Protect weep holes with gravel.

Filter fabric is used for inlet protection when storm water flows are relatively small (0.5 cfs or less) with low velocities and where the inlet drains a relatively flat area (slopes no greater than 5%). This practice cannot be used where inlets are paved or where inlets receive concentrated flows such as in streets or highway medians. The geotextile fabric shall conform to Fort Jackson specifications.

Filter fabric should be purchased in a continuous roll and cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter fabric should be wrapped together only at a support post with both ends securely fastened to the post, with a minimum 6-inch overlap.

The maximum drainage area to this type of inlet is 1 acre.

Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Any needed repairs should be handled immediately.

Sediment should be removed when it reaches approximately $\frac{1}{3}$ the depth of the hole. Maintain the pool area, always providing adequate sediment storage volume for the next storm.

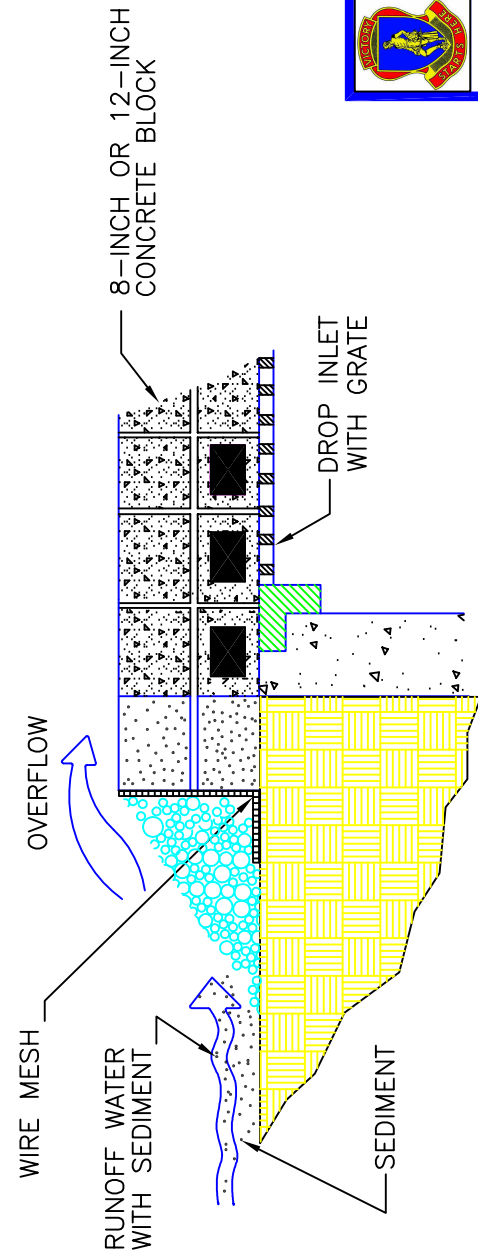
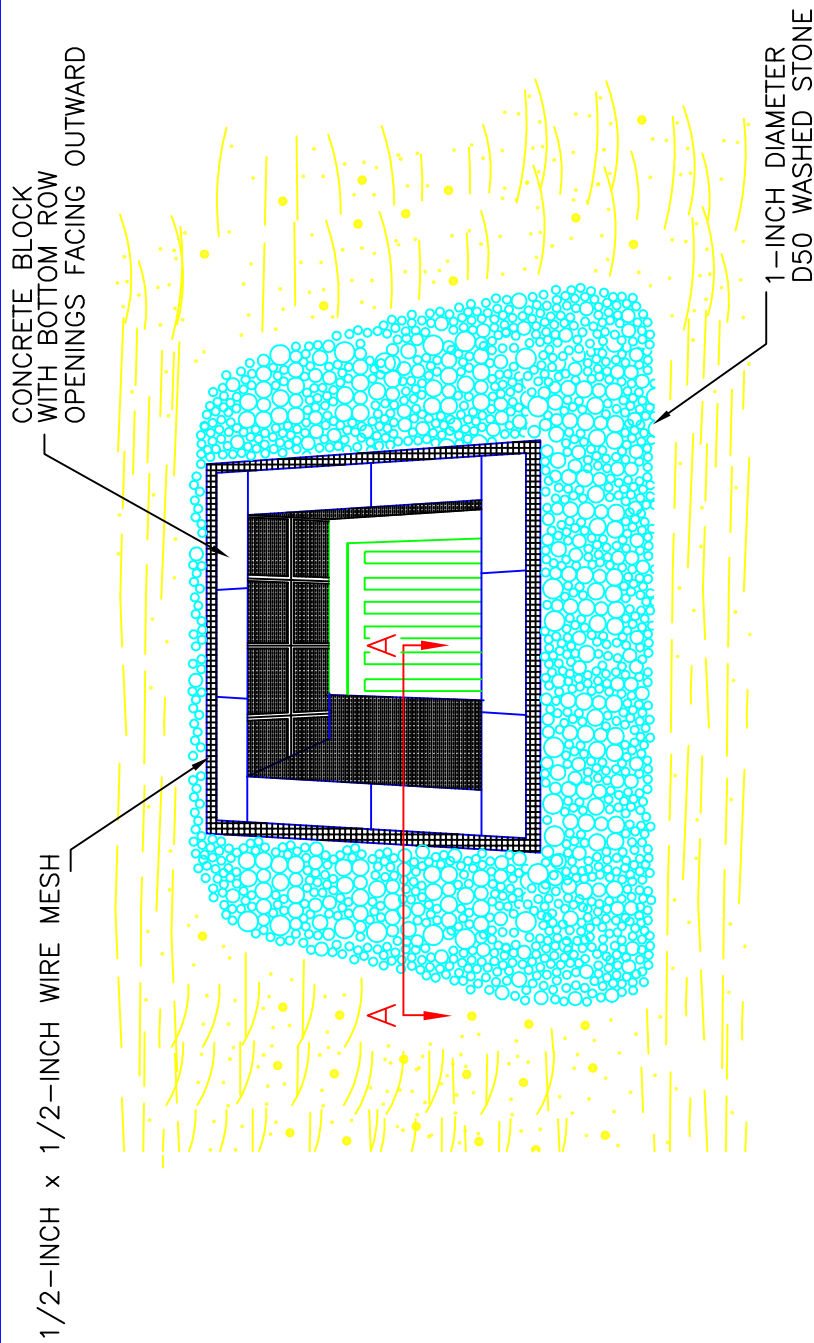
Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Use appropriate permanent stabilization methods to stabilize bare areas around the inlet.



Fort Jackson Land Disturbance Handbook

FILTER FABRIC INLET PROTECTION

STANDARD DRAWING NO. EC-07 Page 2 of 2



CROSS SECTION A-A



Fort Jackson
Land Disturbance Handbook

BLOCK AND GRAVEL DROP
INLET PROTECTION

STANDARD DRAWING NO. EC-08 Page 1 of 2

BLOCK AND GRAVEL DROP INLET PROTECTION

Installation:

Block and gravel filters can be used where heavy flows and higher velocities are expected and where an overflow capacity is necessary to prevent excessive ponding around the structure.

Gravel shall consist of 1-inch D50 Washed Stone and should extend to height equal to the elevation of the top of the blocks.

Place the bottom row of the concrete blocks lengthwise on their side so that the open end faces outward, not upward.

The height of the barrier can be varied, depending upon design needs by stacking a combination of blocks that are 8- and 12-inches wide.

Wire mesh should be placed over the outside vertical face of the concrete blocks to prevent stones from being washed through the holes in the blocks. Hardware cloth or comparable wire mesh with $\frac{1}{2}$ -inch x $\frac{1}{2}$ -inch openings should be used.

Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Any needed repairs should be handled immediately.

Sediment should be removed when it reaches approximately $\frac{1}{3}$ the height of the blocks. If a sump is used, sediment should be removed when it fills approximately $\frac{1}{3}$ the depth of the hole.

If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.

Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.



Fort Jackson Land Disturbance Handbook

BLOCK AND GRAVEL DROP INLET PROTECTION

GRAVEL CURB INLET PROTECTION WITH SEDIMENT FILTER

Installation:

gravel filters can be used where heavy flows and higher velocities are expected and where an overflow capacity is necessary to prevent excessive ponding around the structure.

Gravel shall consist of SCDOT #4 Stone and should extend to height equal to the elevation of the top of the blocks.

Wire mesh should be placed over the top of the curb inlet. Hardware cloth or comparable wire mesh with $\frac{1}{2}$ -inch x $\frac{1}{2}$ -inch openings should be used.

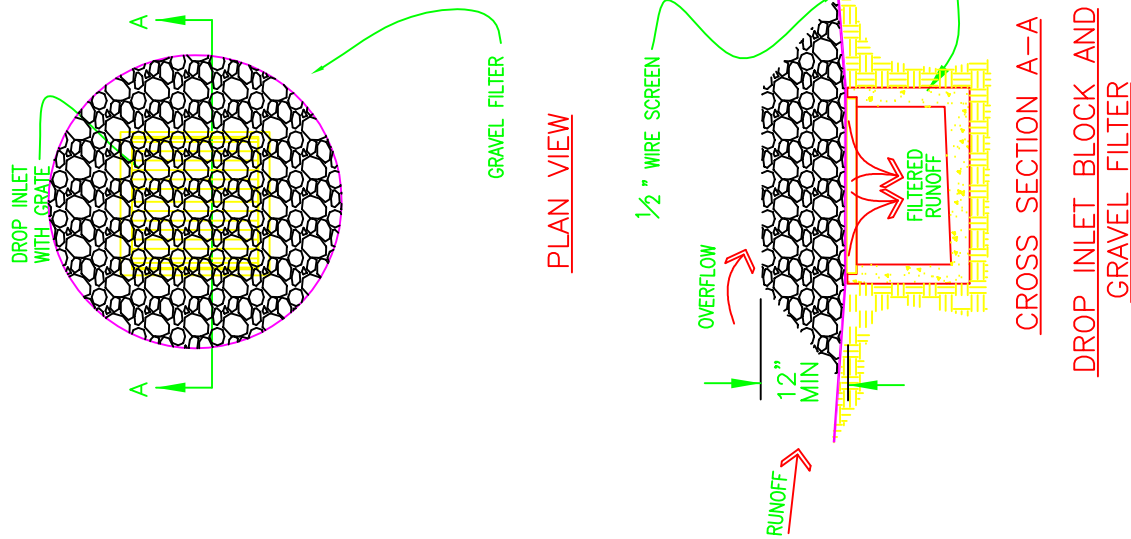
Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Any needed repairs should be handled immediately.

Sediment should be removed when it reaches approximately $\frac{1}{3}$ the height of the inlet.

If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.

Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.



Fort Jackson Land Disturbance Handbook

GRAVEL CURB INLET PROTECTION WITH SEDIMENT FILTER

BLOCK AND GRAVEL CURB INLET PROTECTION

Installation:

Block and gravel filters can be used where heavy flows and higher velocities are expected and where an overflow capacity is necessary to prevent excessive ponding around the structure.

Gravel shall consist of SCDOT #4 Stone and should extend to height equal to the elevation of the top of the blocks.

Place the bottom row of the concrete blocks lengthwise on their side so that the open end faces outward, not upward.

The height of the barrier can be varied, depending upon design needs by stacking a combination of blocks that are 8- and 12-inches wide.

Wire mesh should be placed over the outside vertical face of the concrete blocks to prevent stones from being washed through the holes in the blocks. Hardware cloth or comparable wire mesh with $\frac{1}{2}$ -inch x $\frac{1}{2}$ -inch openings should be used.

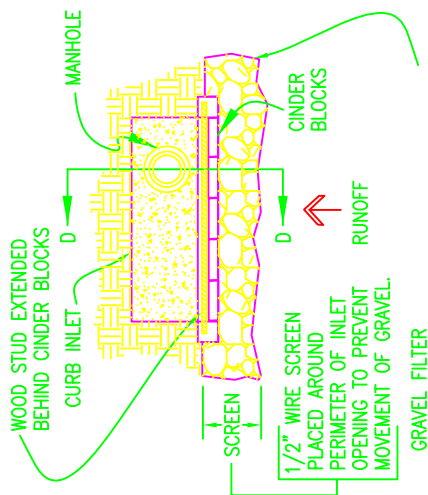
Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Any needed repairs should be handled immediately.

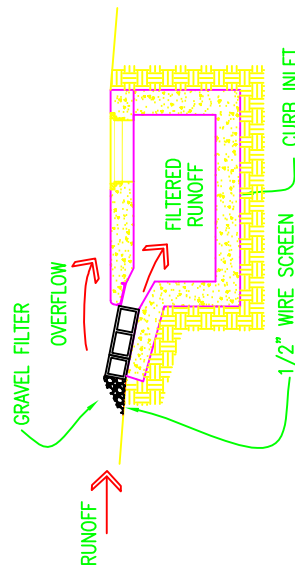
Sediment should be removed when it reaches approximately $\frac{1}{3}$ the height of the blocks. If a sump is used, sediment should be removed when it fills approximately $\frac{1}{3}$ the depth of the hole.

If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.

Bottom drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.



PLAN VIEW



CROSS SECTION D-D

CURB INLET BLOCK AND GRAVEL FILTER

(LOW VOLUME TRAFFIC AREAS ONLY)



**Fort Jackson
Land Disturbance Handbook**

**BLOCK AND GRAVEL CURB
INLET PROTECTION**

STANDARD DRAWING NO. EC-10 Page 1 of 1

GRAVEL CURB INLET PROTECTION WITH SEDIMENT FILTER

Installation:

gravel filters can be used where heavy flows and higher velocities are expected and where an overflow capacity is necessary to prevent excessive ponding around the structure.

Gravel shall consist of SCDOT #4 Stone and should extend to height equal to the elevation of the top of the blocks.

Wire mesh should be placed over the top of the curb inlet. Hardware cloth or comparable wire mesh with $\frac{1}{2}$ -inch x $\frac{1}{2}$ -inch openings should be used.

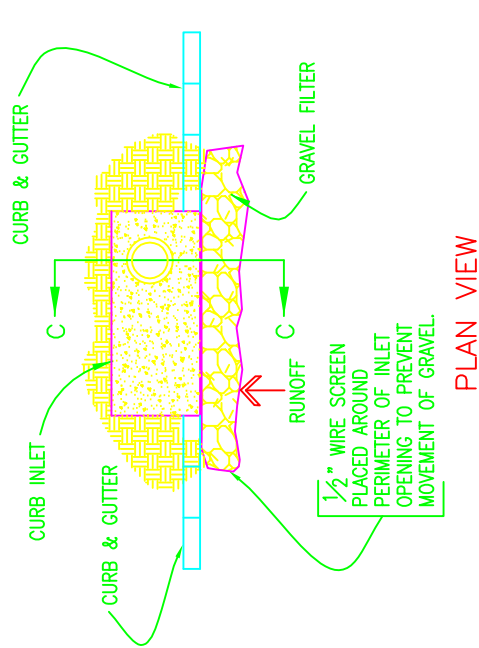
Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Any needed repairs should be handled immediately.

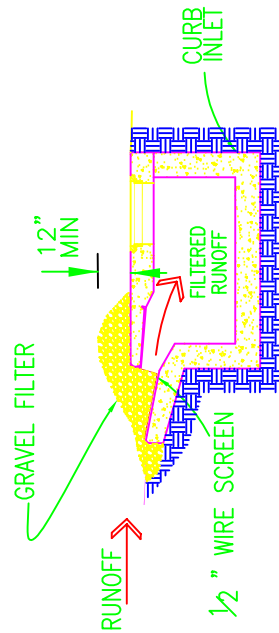
Sediment should be removed when it reaches approximately $\frac{1}{3}$ the height of the inlet.

If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.

Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.



PLAN VIEW



CROSS SECTION C-C

CURB INLET GRAVEL AND
WIRE MESH FILTER



Fort Jackson
Land Disturbance Handbook

GRAVEL CURB INLET PROTECTION
WITH SEDIMENT FILTER

STANDARD DRAWING NO. EC-11 Page 1 of 1

CURB INLET PROTECTION WITH 2"X4" WOODEN WEIR

Installation:

Wooden frame shall be constructed of 2-inch x 4-inch construction grade lumber.

Filter fabric shall conform to Fort Jackson specifications.

Wire mesh across throat shall be continuous piece of 30-inch minimum width with a length 4 feet longer than throat. It shall be shaped and securely nailed to a 2" x 4" weir.

The assembly shall be securely nailed to 2" x 4" spacers 9-inches long spaced a minimum of 6-feet apart.

The assembly shall be placed against the inlet and secured by 2" x 4" anchors 2-feet long extending across the top of the inlet and held in place by sandbags or alternative weights.

The maximum drainage area is 1-acre.

The stone shall consist of SCDOT #4 Washed Stone, shall extend to a minimum height of 12-inches, and shall not exceed 24-inches.

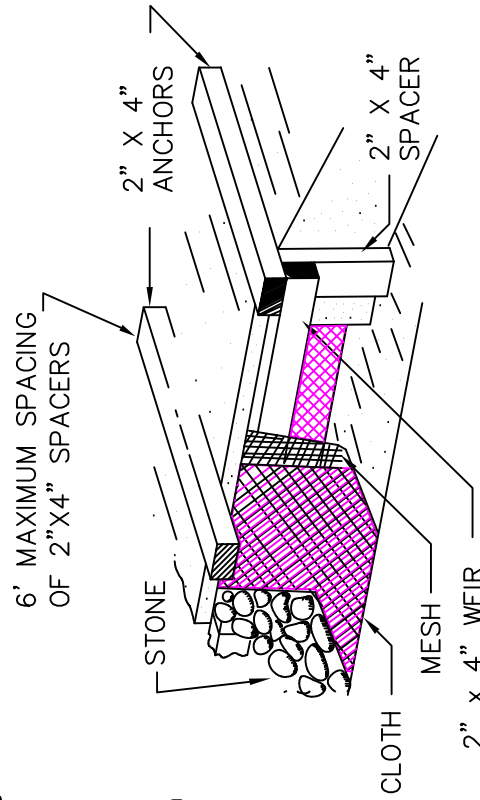
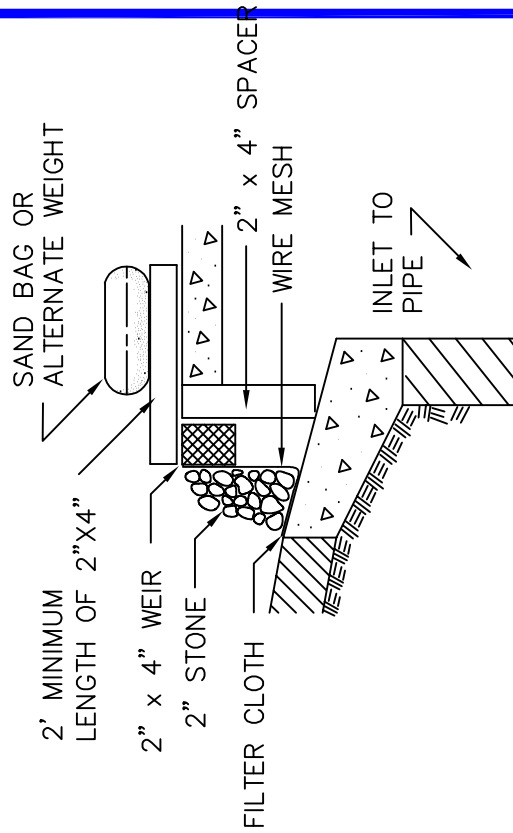
Inspection and Maintenance:

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inches or more of precipitation. Any needed repairs should be handled immediately.

Sediment should be removed when it reaches approximately 1/3 the height of the structure.

If the stone becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.

Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the curb inlet structure crest. Stabilize all bare areas immediately.



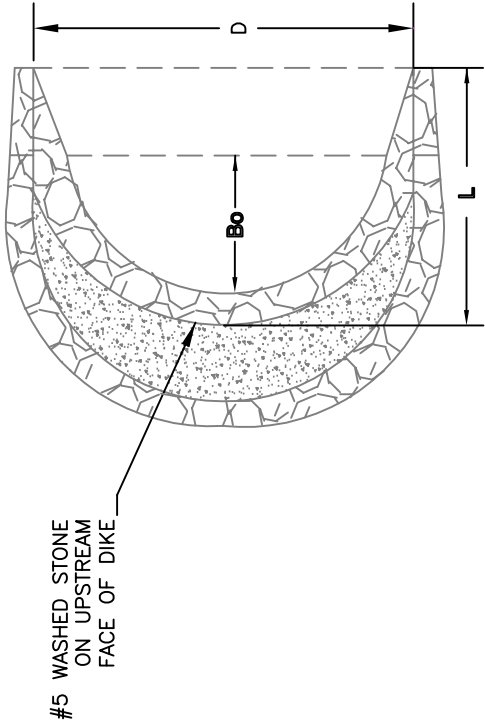
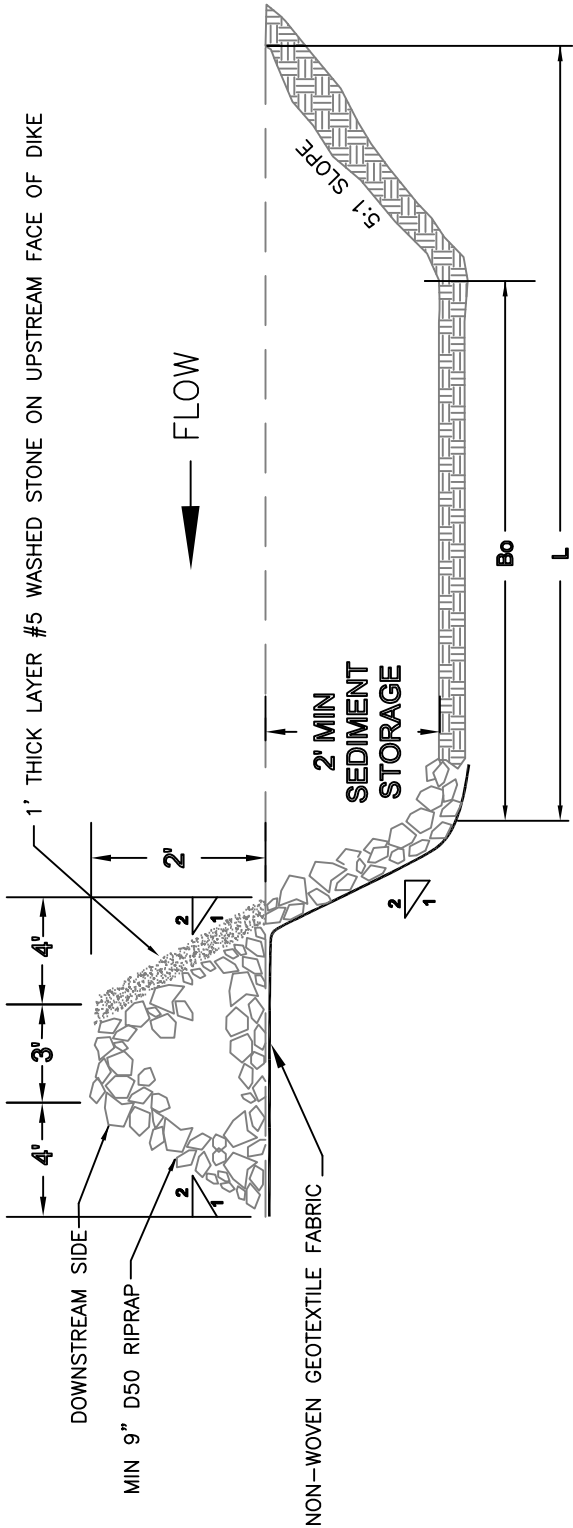
Fort Jackson

Land Disturbance Handbook

CURB INLET PROTECTION WITH WOODEN WEIR

STANDARD DRAWING NO. EC-12 Page 1 of 1

APPROVED BY: FORT JACKSON DLE-ENRD DATE



MAXIMUM 2-ACRE DRAINAGE AREA TO DIKE

TYPICAL ROCK DIKE DIMENSIONS

D	L	Bo	PEAK FLOW (CFS)	TOTAL STORAGE VOL. (CU. FT.)	SEDIMENT STORAGE VOLUME (CU. FT.)
15'	17.5'	3.5'	24.1	838	250
20'	20.0'	6.0'	32.1	1263	406
25'	22.5'	8.5'	40.1	1766	601
30'	25.0'	11.0'	48.2	2348	836

ROCK SEDIMENT DIKE

When and Where to Use It :

Rock sediment dikes are most effective in areas where sediment control is needed with minimal disturbance. They can be used as sediment control structures for the outfalls of diversion swales, diversion dikes, in low areas or other areas where concentrated sediment laden flow is expected. Rock sediment dikes should not be placed in Waters of the State or any other streams that have a base flow.

Installation:

A non-woven geotextile fabric shall be installed over the soil surface where the rock sediment dike is to be placed. Filter fabric shall conform to Fort Jackson specifications.

The body of the rock sediment dike shall be composed of minimum 9-inch D50 Riprap.

The upstream face of the rock sediment dike shall be composed of a 1-foot thick layer of 3/4-inch to 1-inch D50 washed stone placed at a slope of 2H:1V.

Rock sediment dikes shall have a minimum top flow length of 3-feet (2-foot flow length through the riprap and 1-foot flow length through the washed stone).

The rock must be placed by hand or mechanical placement (no dumping of rock to form the sediment dike) to achieve the proper dimensions.

A sediment sump shall be located on the upstream side of the structure to provide sediment storage. The upstream side of the sediment sump shall have a slope of 5H:1V to inhibit erosion of the sediment storage area. The minimum depth of the sediment sump shall be 2-feet. Mark the sediment cleanup level of the sediment dike with a stake in the field.

Seed and mulch all disturbed areas.



Fort Jackson
Land Disturbance Handbook

ROCK SEDIMENT DIKE

STANDARD DRAWING NO. EC-13 Page 2 of 3

ROCK SEDIMENT DIKE

Inspection and Maintenance:

The key to a functional rock sediment dike is continual monitoring, regular maintenance and regular sediment removal.

Regular inspections should be done every seven (7) calendar days and within 24–hours after each rainfall event that produces $\frac{1}{2}$ –inches or more of precipitation.

Remove sediment when it reaches 50% of the sediment storage volume or when reaches the top of cleanout stake. Removed sediment from the sump should be removed from, or stabilized on site.

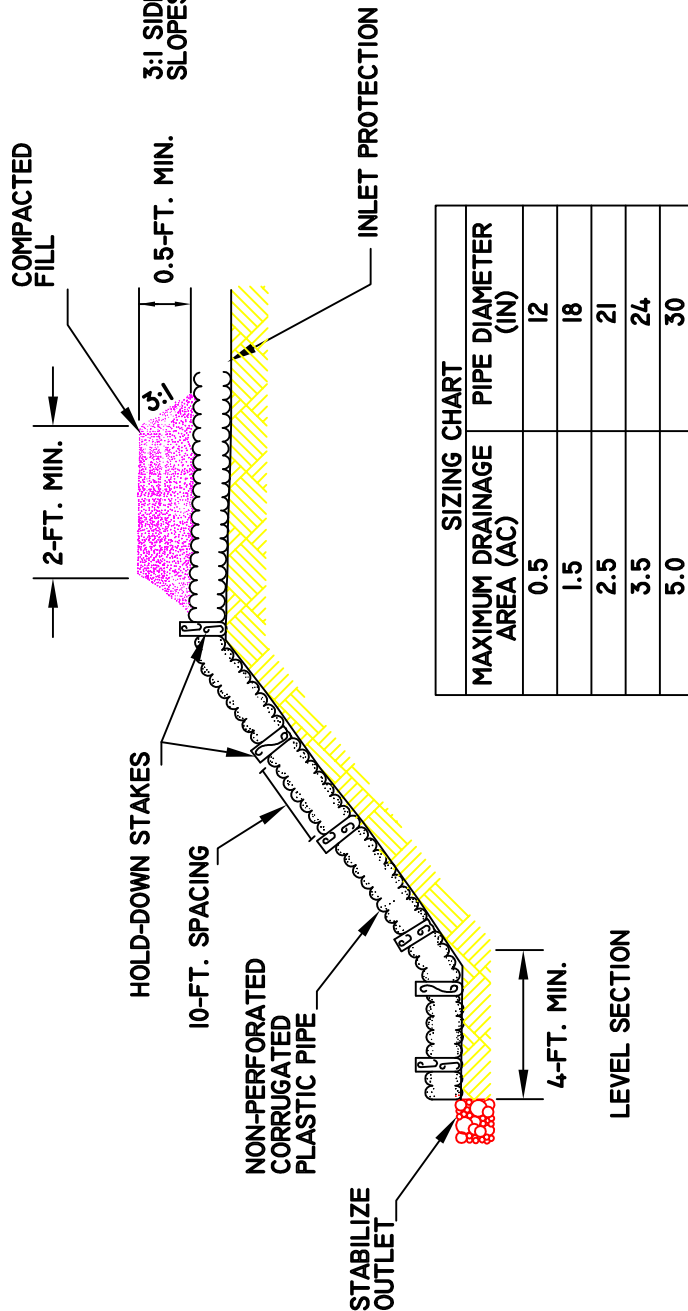
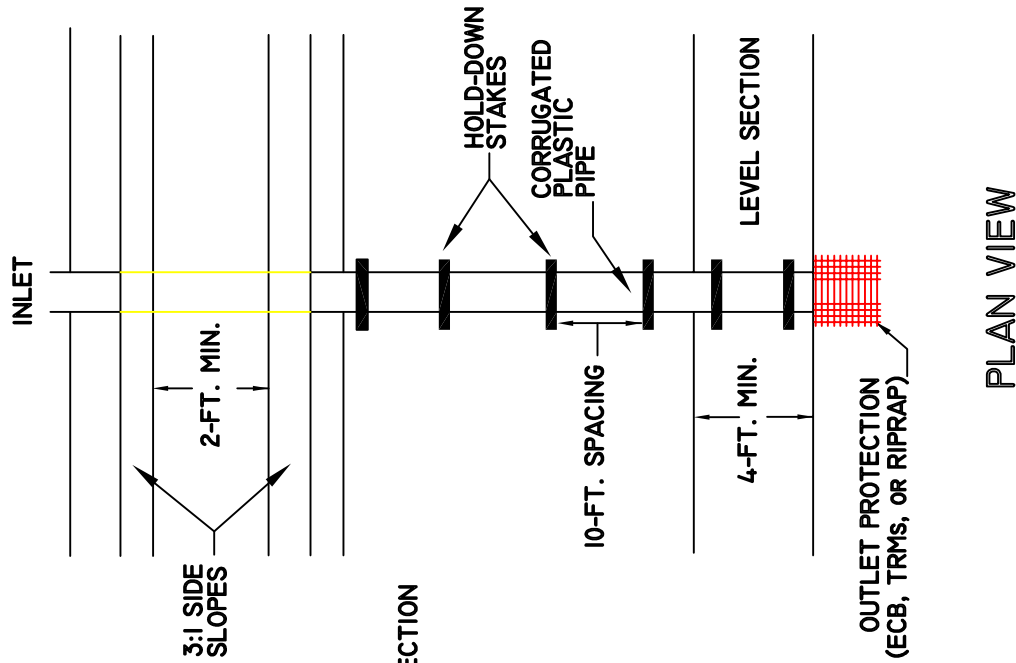
All rock sediment dikes should be removed within 30 days after final site stabilization is achieved or after they are no longer needed. Disturbed areas resulting from the removal of rock sediment dikes should be permanently stabilized.



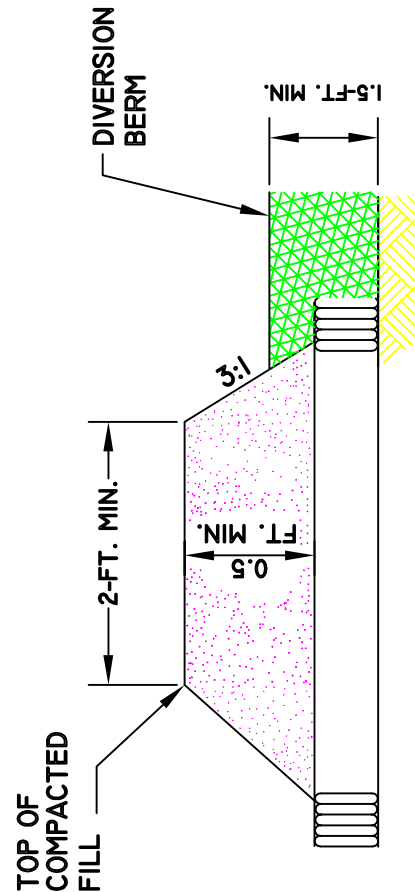
Fort Jackson
Land Disturbance Handbook

ROCK SEDIMENT DIKE

STANDARD DRAWING NO. EC-13 Page 3 of 3



SIZING CHART	
MAXIMUM DRAINAGE AREA (AC)	PIPE DIAMETER (IN)
0.5	12
1.5	18
2.5	21
3.5	24
5.0	30



PIPE SLOPE DRAIN

When and Where to Use It

Pipe slope drains are used when it is necessary for water to flow down a slope without causing erosion, especially before a slope has been stabilized or before permanent drainage structures are installed.

Installation:

Typical pipe slope drains are made of non-perforated corrugated plastic pipe designed to pass the peak flow rates for the 10-year 24-hour storm event.

Slope drain sections should be securely fastened together, have gasket watertight fittings, and be securely anchored into the soil.

Diversion berms or dikes should direct runoff to slope drains. The minimum depth of these dikes or berms should be 1.5-feet. The height of the berm around the pipe inlet should be a minimum of 1.5-foot high and at least 0.5-foot higher than the top of the pipe. The berm at the pipe inlet shall be compacted around the pipe. The area around the inlet shall be properly stabilized with ECBs, TRMs, riprap or other applicable stabilization techniques.

The area below the outlet must be properly stabilized with ECBs, TRMs, riprap or other applicable stabilization technique.

If the pipe slope drain is conveying sediment-laden water, direct all flows into the sediment trapping facility.

Permanent slope drains should be buried beneath the soil surface a minimum 1.5-feet.

Inspection and Maintenance:

Inspect pipe slope drain inlet and outlet points every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation.

The inlet should be free from undercutting, and no water should be going around the point of entry. If there are problems, the headwall should be reinforced with compacted earth or sandbags. The outlet point should be free of erosion and installed with appropriate outlet protection.

All temporary pipe slope drains should be removed within 30 days after final site stabilization is achieved or after the temporary BMP is no longer needed. Disturbed soil areas resulting from removal should be permanently stabilized.

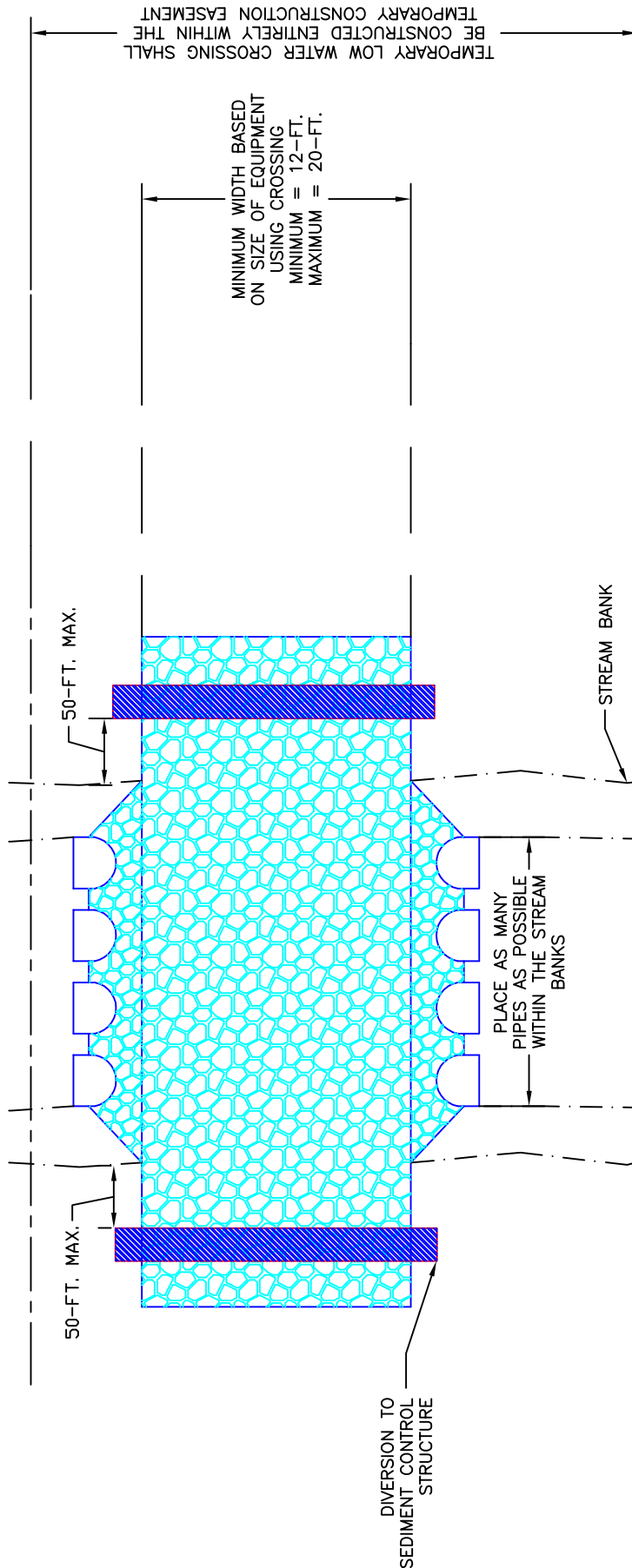




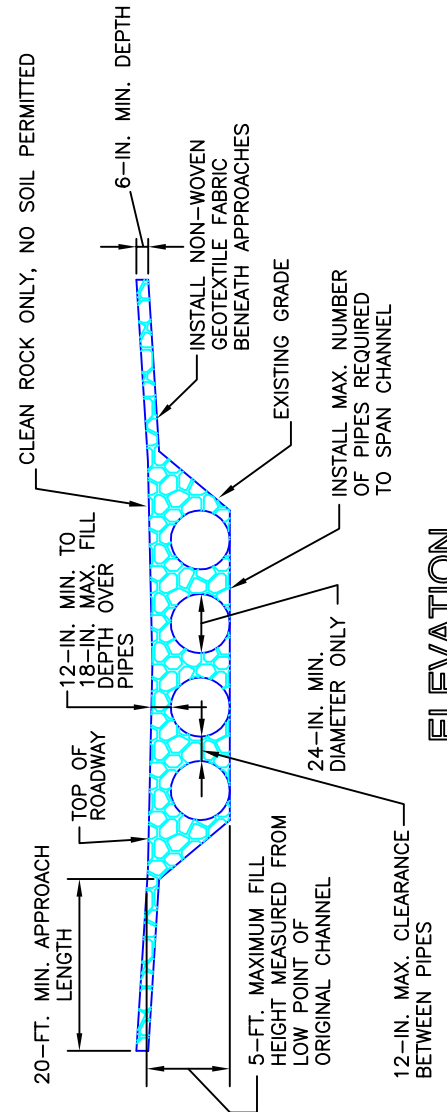
Fort Jackson
Land Disturbance Handbook

TEMPORARY STREAM
LOW WATER CROSSING

STANDARD DRAWING NO. EC-15 Page 1 of 3



PLAN VIEW



ELEVATION

TEMPORARY STREAM LOW WATER CROSSING

Prior to constructing a temporary stream crossing, the owner/person financially responsible for the project must submit an Application for Permit to Construct Across or Along a Stream to the South Carolina Department of Health and Environmental Control (SC DHEC). Temporary stream crossings require a Section 404 Permit from the Corps of Engineers. If the crossing creates more than 200 linear feet of fill or more than $\frac{1}{3}$ acre of fill, a 401 permit may be necessary.

Installation:

Crossings shall be installed prior to any other activities.

Pump-around diversions shall be installed and maintained prior to any excavation and during the installation of the crossing.

Crossings shall be placed in temporary construction easements only.

The temporary waterway crossing shall be at right angles to the stream. Where approach conditions dictate, the crossing may vary 15 degrees from a line drawn perpendicular to the centerline of the stream at the intended crossing location. However every effort shall be taken to install the crossing perpendicular to the stream. All fill materials associated with the roadway approach shall be limited to a maximum height of 2-feet above the existing flood plain elevation.

A water diverting structure such as a dike or swale shall be constructed (across the roadway on both roadway approaches) 50-feet (maximum) on either side of the waterway crossing. This will prevent roadway surface runoff from directly entering the waterway. The 50-feet is measured from the top of the waterway bank. The flow captured in these dikes and swales shall be directed to a sediment trapping structure. If the roadway approach is constructed with a reverse grade away from the waterway, a separate diverting structure is not required.

Streambank clearing shall be kept to a minimum. Do not excavate rock bottom streambeds to install the crossing. Lay the culvert pipes on the streambed "as is" when applicable. Place as many pipes as possible within the low area of the stream. Place remaining pipes required to cross the stream on the existing stream bottom.

The maximum number of pipes as possible should be placed within the stream banks with a maximum spacing of 12-inches between pipes. The minimum sized pipe culvert that may be used is 24-inches.

The length of the culvert shall be adequate to extend the full width of the crossing, including side slopes. The slope of the culvert shall be at least 0.25 feet per foot.

Coarse aggregate of clean limestone riprap with a 6-inch D50 stone or greater will be used to form the crossing. The depth of stone cover over the culvert shall be equal to $\frac{1}{2}$ the diameter of the culvert or 12-inches, whichever is greater but no greater than 18-inches.



Fort Jackson
Land Disturbance Handbook

TEMPORARY STREAM
LOW WATER CROSSING

STANDARD DRAWING NO. EC-15 Page 2 of 3

TEMPORARY STREAM LOW WATER CROSSING

Installation:

All fill materials associated with the roadway approach shall be limited to a maximum height of 2–feet above the existing flood plain elevation.

The approaches to the structure shall consist of clean stone or concrete fill only with a minimum thickness of 6–inches. The minimum approach length shall be 20–feet and the width shall be equal to the width of the structure.

Inspection and Maintenance:

Inspect crossings every seven (7) calendar days and within 24–hours after each rainfall event that produces $\frac{1}{2}$ –inches or more of precipitation. Check the structure integrity and for excessive sediment deposition and replace fill stone as needed.

Clean mud and/or sediment from the roadway and do not allow it to enter the stream.

The structure shall be removed when it is no longer required to provide access to the construction area. During removal, leave stone and geotextile fabric for approaches in place. Place fill over the approaches as part of the stream bank restoration operation.

A temporary culvert crossing should be in place no longer than 24–months.



Fort Jackson Land Disturbance Handbook

TEMPORARY STREAM
LOW WATER CROSSING

STANDARD DRAWING NO. EC-15 Page 3 of 3

DIKE MATERIAL COMPACTED
90% STANDARD PROCTOR

2-FT. MIN.

2:1 OR
FLATTER

1.5-FOOT MIN.

8-FT. MIN.

DIKE SPACING = 100-FT., 200-FT., OR 300-FT. DEPENDING ON GRADE



Fort Jackson
Land Disturbance Handbook

DIVERSION DIKE OR BERM

STANDARD DRAWING NO. EC-16 Page 1 of 2

DIVERSION DIKES AND BERMS

Installation

The top width should be a minimum of 2—feet, and the height should be at least 1.5—feet from the upslope toe.

The side slopes should be 2H:1V or flatter.

Grades should be between 0.5% and 1.0%.

Slopes shall be stabilized immediately using vegetation, sod, and erosion control blankets or turf reinforcement mats to prevent erosion.

The upslope side of the dike should provide positive drainage so no erosion occurs at the outlet. Provide energy dissipation measures as necessary. Sediment—laden runoff must be released through a sediment trapping facility.

Sediment—laden runoff shall be directed to a sediment trapping facility.

Minimize construction traffic over diversion dikes and berms.

Inspection and Maintenance:

Dikes and Berms should be inspected, every seven (7) calendar days and within 24—hours after each rainfall event that produces ½—inches or more of precipitation and repairs made as necessary.

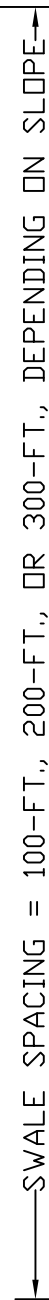
Damage caused by construction traffic or other activity must be repaired before the end of each working day.



Fort Jackson
Land Disturbance Handbook

DIVERSION DIKE OR BERM

STANDARD DRAWING NO. EC-16 Page 2 of 2



STANDARD DRAWING NO. EC-17 Page 1 of 2

DIVERSION SWALE

Installation

The bottom width should be a minimum of 2—feet, and the bottom should be level.

The depth should be a minimum of 1.5—feet and the side slopes should be 2H:1V or flatter.

The maximum grade shall be 5%, with positive drainage to a suitable outlet.

Slopes shall be stabilized immediately using vegetation, sod, and erosion control blankets or turf reinforcement mats to prevent erosion.

The upslope side of the swale should provide positive drainage so no erosion occurs at the outlet. Provide energy dissipation measures as necessary.

Sediment—laden runoff shall be directed to a sediment trapping facility.

Inspection and Maintenance:

Swales should be inspected, every seven (7) calendar days and within 24—hours after each rainfall event that produces ½—inches or more of precipitation and repairs made as necessary.

Damage caused by construction traffic or other activity must be repaired before the end of each working day.



Fort Jackson
Land Disturbance Handbook

DIVERSION SWALE

STANDARD DRAWING NO. EC-17 Page 2 of 2

SANDBAG AND SANDBAG BARRIER

Installation:

Individual sandbags to be filled as shown. End of sandbag are to be folded over to close, not stitched or sown. Sizes shall are standard Army detail.

Sandbags can be filled with sand, gravel, or other non-toxic or degradable sediments.

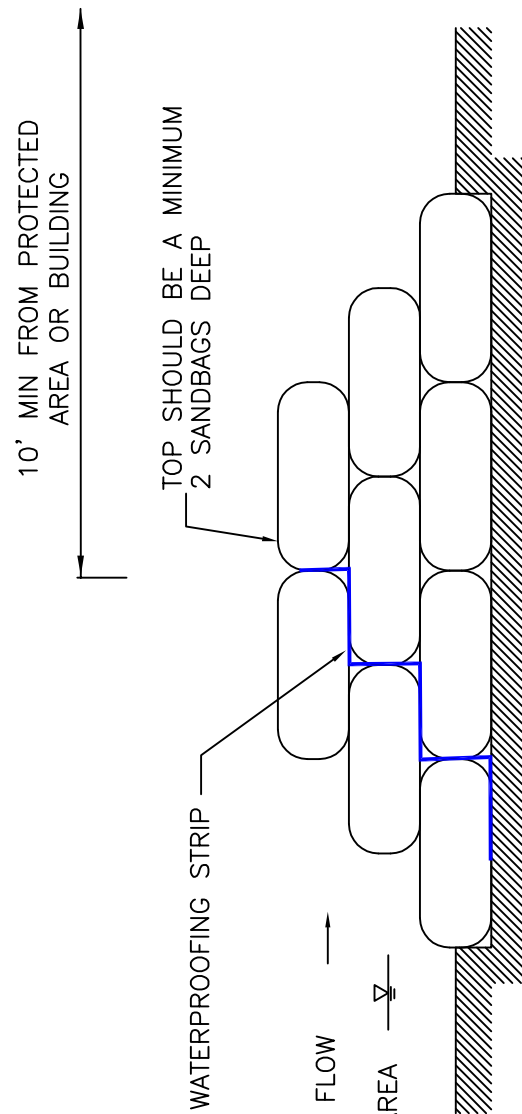
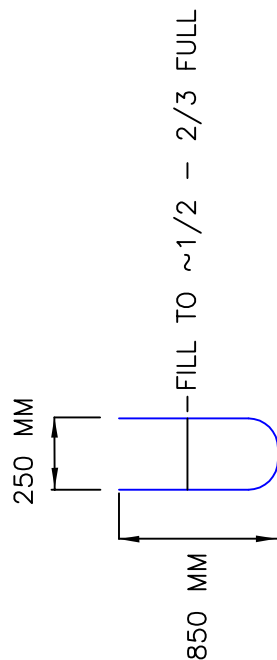
Sandbag material to be a non-woven geotextile fabric which meets Fort Jackson specifications.

Sandbag barrier should have a width to height ratio of 3:1. Barrier should be pyramid shaped with no vertical walls.

Bottom level of barrier should be placed in trench with a depth of 120 – 250 mm.

Ends of sandbags to be butted tightly together within barrier.

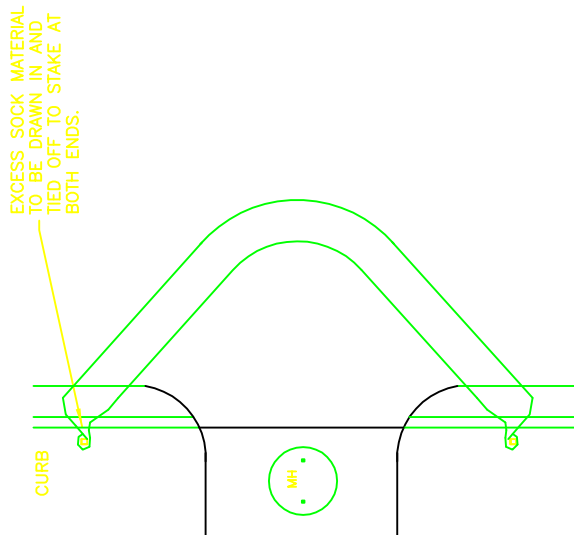
If waterproofing is desired, run water proofing strip through barrier as shown.



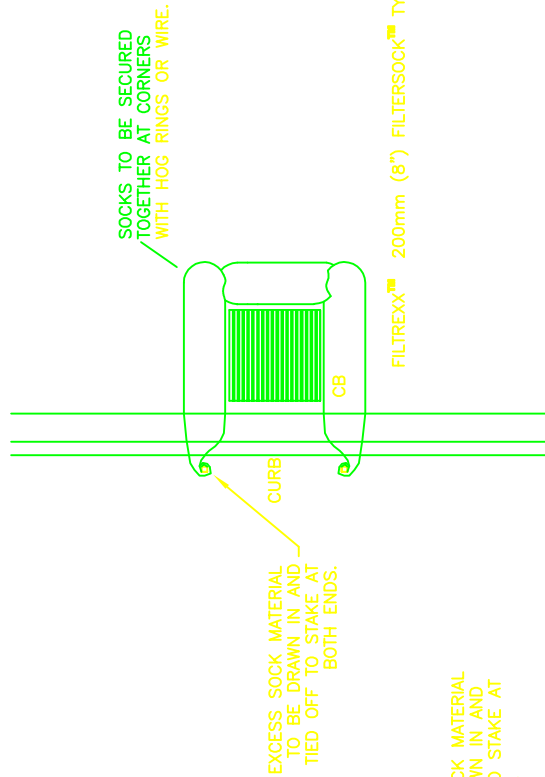
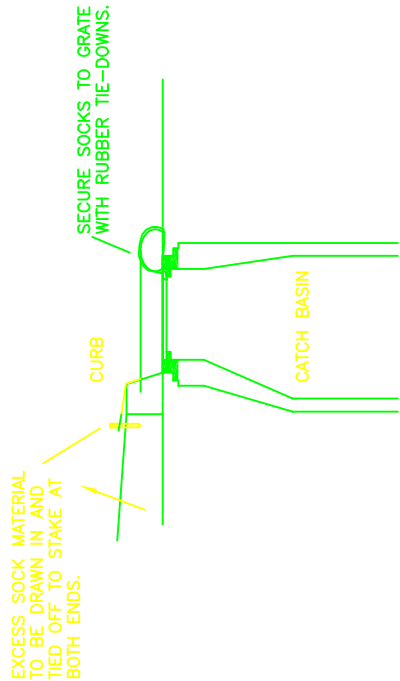
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SANDBAG DETAILS

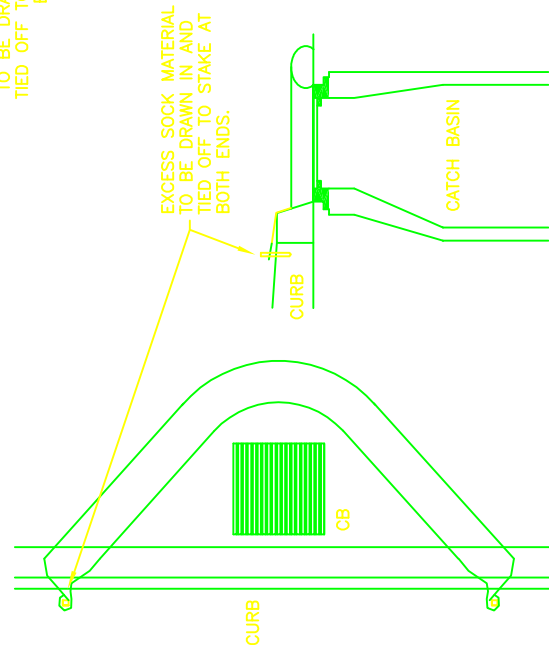
STANDARD DRAWING NO. EC-18 Page 1 of 1



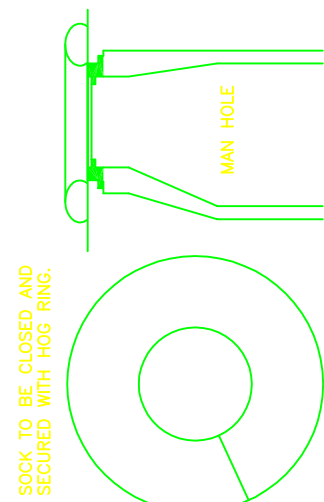
CURB INLET



CATCH BASIN OPTION "B"
FOR USE IN TIGHTER AREAS, NARROW ROADS ETC.



CATCH BASIN OPTION "A"



MANHOLE



Fort Jackson
Land Disturbance Handbook

SOCK-TYPE INLET
PROTECTION

STANDARD DRAWING NO. EC-19 Page 1 of 2

SOCK INLET PROTECTION

When and Where to Use It

Use as temporary protection during construction of any curb, grate, or yard inlets, manholes, or catch basins

Installation:

Socks should be placed around inlet to prevent sediment from entering storm drain system.

Socks are filled with various materials can vary depending on intended use. Engineer should specify this material or sock manufacturer specification should be used.

Sock should be anchored as specified by manufacturer.

If vegetation is to be integrated into sock, it should be filled with manufacturer approved compost material.

Inspection and Maintenance:

Inspect every seven (7) calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Inspect for sediment and debris accumulation. Inspect edges for erosion and repair promptly as required.

Sediment should be removed when it reaches $\frac{1}{3}$ the original sock height.

All protection devices should be removed from site within 30 days after construction activities have ceased.



Fort Jackson
Land Disturbance Handbook

SOCK-TYPE INLET
PROTECTION

STANDARD DRAWING NO. EC-19 Page 2 of 2

SOCK FENCE

When and Where to Use It

Sock fences are considered equivalent to silt fences and can therefore be used any place or situation where silt fences would be used.

Installation:

Sock fences should be placed on level contours to assist in dissipating sheet flow rather than concentrated flow. The end of the fence should pointing upslope.

Sock fences should be placed a minimum of 5 feet from the toe of slopes.

Sock fence should be anchored as specified by manufacturer.

If vegetation is to be integrated into fence, sock should be filled with manufacturer approved compost material.

Inspection and Maintenance:

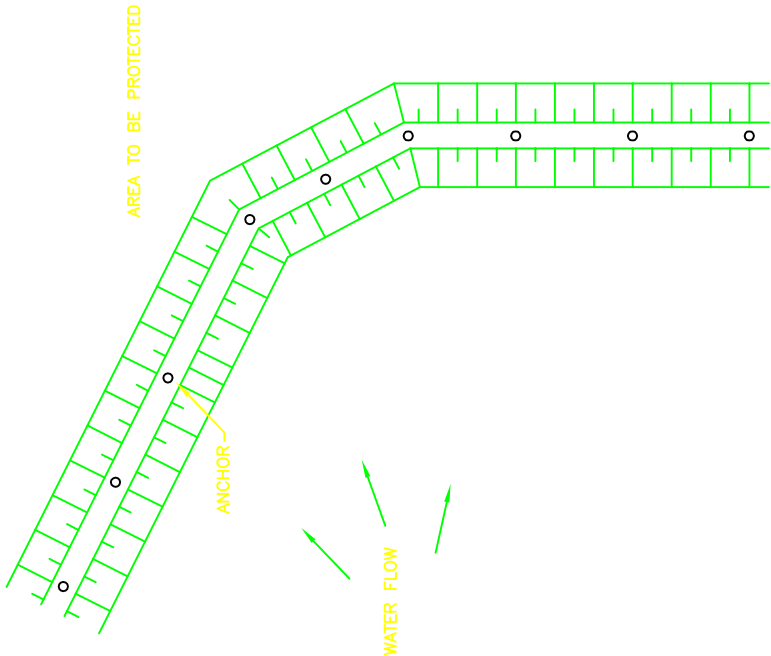
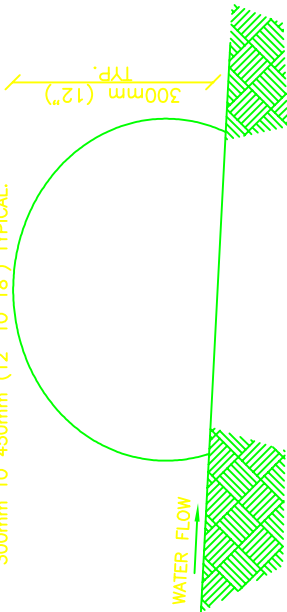
Inspect every seven (7) calendar days and within 24-hours after each rainfall event that produces ½-inches or more of precipitation. Inspect for sediment and debris accumulation. Inspect edges for erosion and repair promptly as required.

Sediment should be removed when it reaches 1/3 the original sock height.

All non-permanent fences should be removed from site within 30 days after construction activities have ceased.

SOCK OPTION:

FILTER SOCK, SIZED TO SUIT CONDITIONS.
300mm TO 450mm (12" TO 18") TYPICAL.



GEOTEXTILE FILTER FABRIC

When and Where to Use It

Geotextile fabric should be used as specified in details or as directed by the Engineer or Fort Jackson personnel.

Strength Specifications:

Piping Resistance (Soil Retention) & Permittivity Requirements:

	Class 1 ¹		Class 2	AOS (ASTM D 4751)	Permittivity (ASTM D 4491)
	Fabric Protected	Fabric Unprotected	Fabric Unprotected		
Grab Strength ASTM D 4632	90 lbs.	200 lbs.	Type A	=No. 30 Std Sieve	=0.7 sec-1
Seam Strength ² ASTM D 4632	80 lbs.	180 lbs.	Type B	=No. 40 Std Sieve	=0.2 sec-1
Puncture Strength ASTM D 4833	40 lbs.	80 lbs.	Type C	=No. 60 Std Sieve	=0.1 sec-1
Burst Strength ASTM D 3786	140 psi.	250 psi.	Type D	AOS and fabric permittivity requirements will be based on site specific design and will be indicated in the special provisions of the proposal.	
Trapezoid Tear Strength ASTM D 4533	40 lbs.	80 lbs.	Type A	Type A fabric will generally be specified for soils with less than 15% particles by weight passing the No. 200 sieve.	
Elongation at Failure ASTM D 4632	15% minimum	15% minimum	Type B	Type B fabric will generally be specified for soils with 15% to 50% particles by weight passing the No. 200 sieve.	
Ultraviolet Degradation at 500 Hours ASTM D 4355	50% Strength Retained	50% Strength Retained	Type C	Type C fabric will generally be specified for soils with more than 50% particles by weight passing the No. 200 sieve.	
1 Fabric is said to be protected when cushioned from rock placement by a sufficient layer of sand or gravel at least 6 inches thick or by zero height placement. All other conditions are said to be unprotected.					
2 Values apply to both field and manufactured seams. Seams should be sewn upwards for inspection.					
Fort Jackson soils will normally require either Type A or B filter fabrics. Some soils on post may require Type C filter fabric depending on depth of land disturbance and location.					

¹ Fabric is said to be protected when cushioned from rock placement by a sufficient layer of sand or gravel at least 6 inches thick or by zero height placement. All other conditions are said to be unprotected.

² Values apply to both field and manufactured seams. Seams should be sewn upwards for inspection.

Type D fabric will generally be specified for Critical/Severe Applications

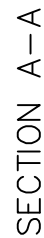
Fort Jackson soils will normally require either Type A or B filter fabrics. Some soils on post may require Type C filter fabric depending on depth of land disturbance and location.



Fort Jackson
Land Disturbance Handbook

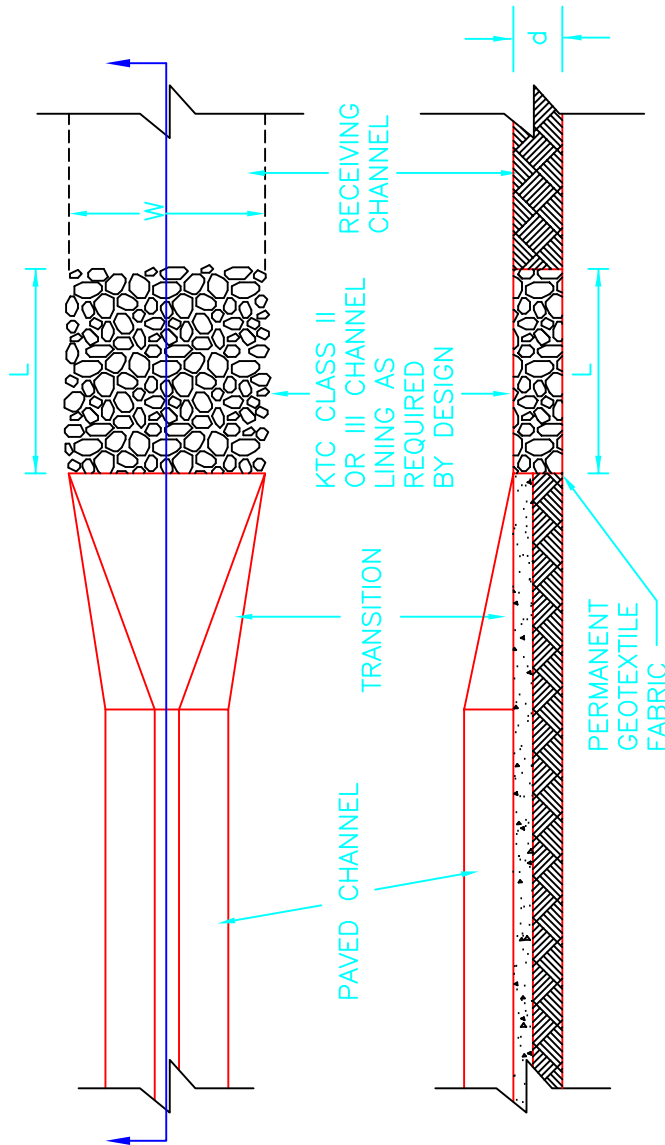
GEOTEXTILE FILTER FABRIC

STANDARD DRAWING NO. EC-21 Page 1 of 1



Fort Jackson Land Disturbance Handbook

STANDARD DRAWING NO. SD-01 Page 1 of 1



NOTES:

1. RIPRAP APRON REDUCES THE FLOW VELOCITY BELOW THE PERMISSIBLE VELOCITY OF THE NATURAL RECEIVING CHANNEL.

2. TRANSITION SIDE DIVERGENCE IS 1 IN 3F, WHERE

$$F = \text{FROUDE NUMBER} = \frac{V}{\sqrt{gd}}, \text{ WHERE}$$

V = VELOCITY AT THE BEGINNING OF THE TRANSITION

d = DEPTH OF FLOW AT THE BEGINNING OF THE TRANSITION

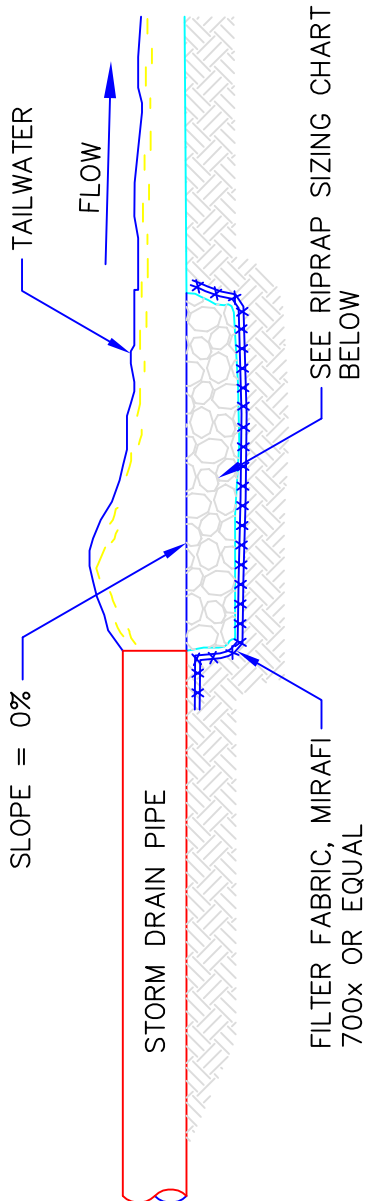
g = 32.2 ft./sec²



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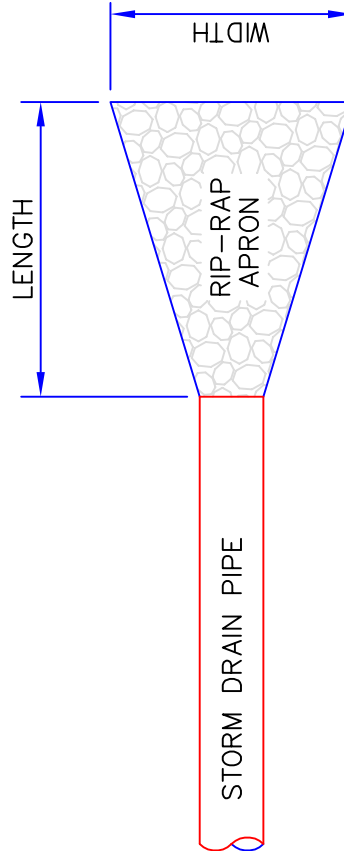
PAVED/CHANNEL OUTLET

STANDARD DRAWING NO. SD-02 Page 1 of 2



SECTION

RIP-RAP SIZING	
PIPE DIA. (IN.)	D50 (IN.)
12	6
15	6
18	6
24	9
30	9
36	9
42	12
48	12



PLAN

RIP-RAP SCHEDULE		
PIPE DIA. (IN.)	LENGTH (FT.)	WIDTH (FT.)

(TO BE COMPLETED BEFORE SUBMITTAL)

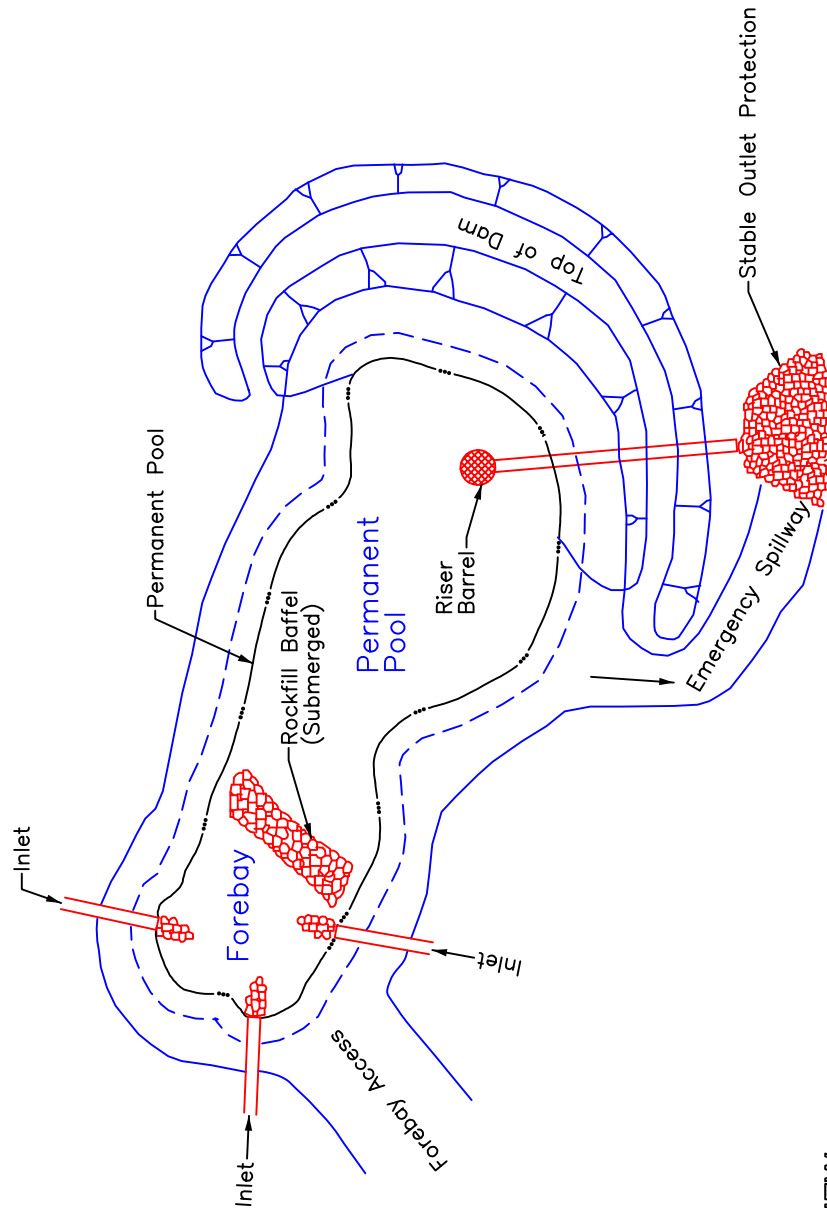
RIP-RAP APRON
NOT TO SCALE



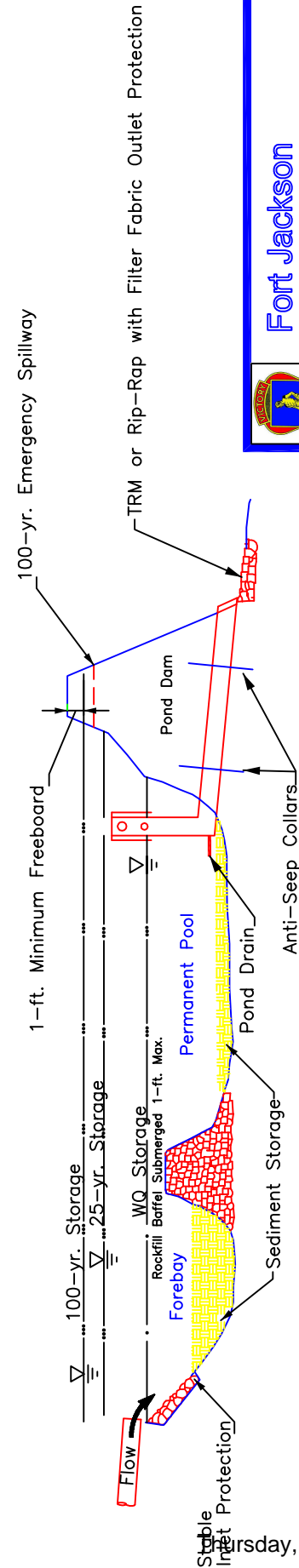
Fort Jackson
Land Disturbance Handbook

PIPE/CHANNEL OUTLET

STANDARD DRAWING NO. SD-02 Page 2 of 2



PLAN VIEW



PROFILE



Fort Jackson
Land Disturbance Handbook

WET DETENTION POND

WET DETENTION POND

Wet ponds have a permanent (dead storage) pool of water equal to the water quality volume. Temporary storage (live storage) may be added above the permanent pool elevation for larger flows.

Installation:

A forebay shall be provided for all inlets to a wet water quality pond and shall be placed upstream of the main wet pond area. The forebay is separated from the larger wet detention pond area by barriers or baffles that may be constructed of earth, stones, riprap, gabions, or geotextiles. The top of the forebay barrier shall be a maximum of one (1)-foot below the normal pool elevation, and may extend above the elevation of the permanent pool.

The permanent pool shall be four (4) to six (6) feet in depth.

A low flow orifice shall be installed to slowly release the water quality volume. The low flow orifice shall be protected from clogging by designing appropriate trash guards. Acceptable trash guards include:

Hoods that extend at least 6-inches below the permanent pool water surface elevation.

Reverse flow pipes where the outlet structure inlet is located at least 6-inches below the permanent pool water surface elevation.

Trash boxes made of sturdy wire mesh.

Emergency spillways shall be installed to safely pass the post-development 100-year 24-hour storm event without overtopping any dam structures.

Inspection and Maintenance:

The side slopes of the pond shall be mowed monthly.

Since decomposing vegetation captured in the wetpond can release pollutants, especially nutrients, it may be necessary to harvest dead vegetation annually. Otherwise the decaying vegetation can export pollutants out of the pond and also can cause nuisance conditions to occur.

Debris shall be cleared from all inlet and outlet structures monthly.

All eroded or undercut areas shall be repaired as needed.

A sediment marker shall be placed in the forebay to determine when sediment removal is required.

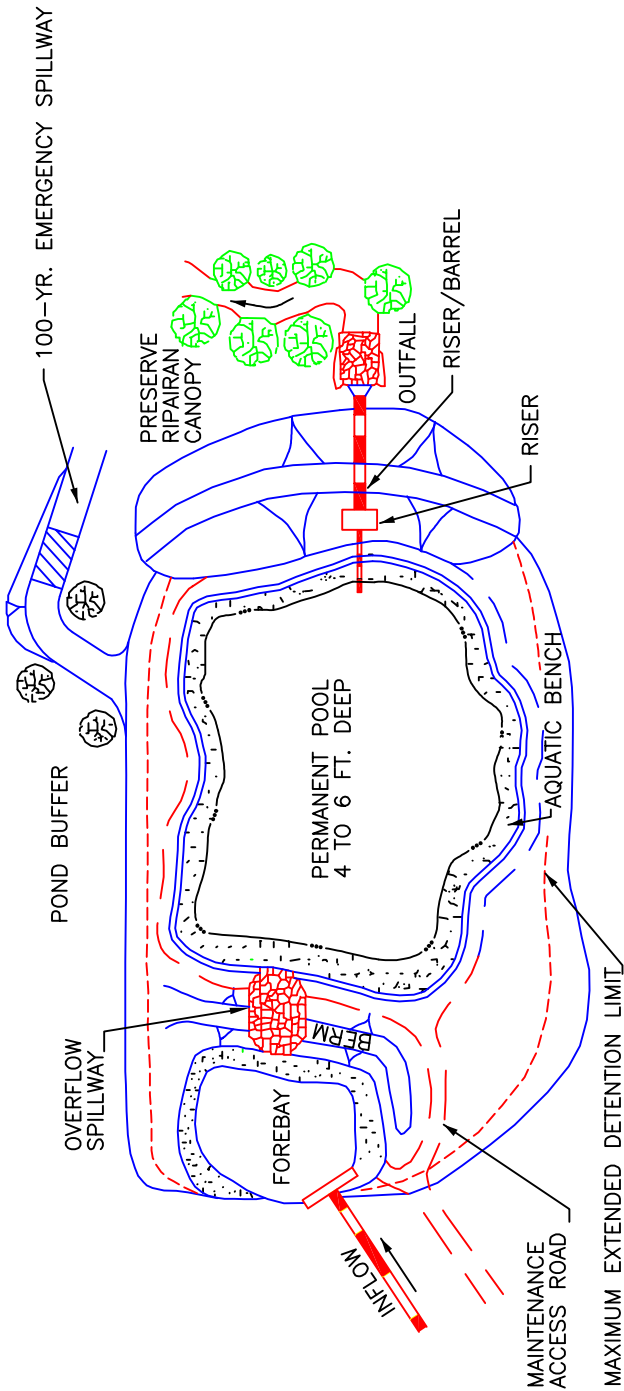
Sediment accumulations in the main pond area shall be monitored and sediment shall be removed when the permanent pool volume has been significantly filled and/or the pond becomes eutrophic.



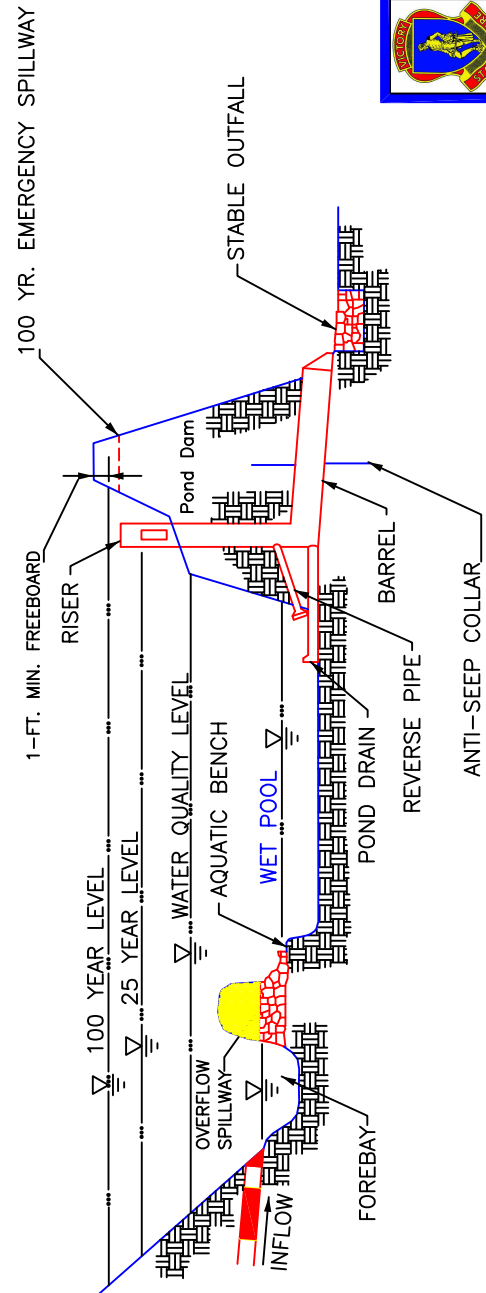
Fort Jackson
Land Disturbance Handbook

WET DETENTION POND

STANDARD DRAWING NO. WQ-01 Page 2 of 2



PLAN VIEW



PROFILE



Fort Jackson
Land Disturbance Handbook

WET EXTENDED DETENTION POND

STANDARD DRAWING NO. WQ-02 Page 1 of 2

WET EXTENDED DETENTION POND

A wet extended pond is a wet pond where the water quality volume is split evenly between the permanent pool and extended detention storage provided above the permanent pool. During storm events, water is stored above permanent pool and released over 24–hours. The design has similar pollutant removal efficiencies as traditional wet ponds, but consumes less space.

Installation:

A forebay shall be provided for all inlets to a wet extended water quality pond and shall be placed upstream of the main wet pond area. The forebay is separated from the larger wet detention pond area by a berm that may be constructed of earth, stones, riprap, gabions, or geotextiles. The top of the forebay barrier shall be equal to the normal pool elevation, and may extend above the elevation of the permanent pool. A spillway shall be constructed to convey flow from the forebay to the wet detention pond area.

The permanent pool shall be four (4) to six (6) feet in depth.

A low flow orifice shall be installed to slowly release the water quality volume. The low flow orifice shall be protected from clogging by designing appropriate trash guards. Acceptable trash guards include:

Hoods that extend at least 6–inches below the permanent pool water surface elevation.

Reverse flow pipes where the outlet structure inlet is located at least 6–inches below the permanent pool water surface elevation.

Trash boxes made of sturdy wire mesh.

Emergency spillways shall be installed to pass the post–development 100–year 24–hour storm event without overtopping any structures.

Inspection and Maintenance:

The side slopes of the pond shall be mowed monthly.

Since decomposing vegetation captured in the wetpond can release pollutants, especially nutrients, it may be necessary to harvest dead vegetation annually. Otherwise the decaying vegetation can export pollutants out of the pond and also can cause nuisance conditions to occur.

Debris shall be cleared from all inlet and outlet structures monthly.

All eroded or undercut areas shall be repaired as needed.

A sediment marker shall be placed in the forebay to determine when sediment removal is required.

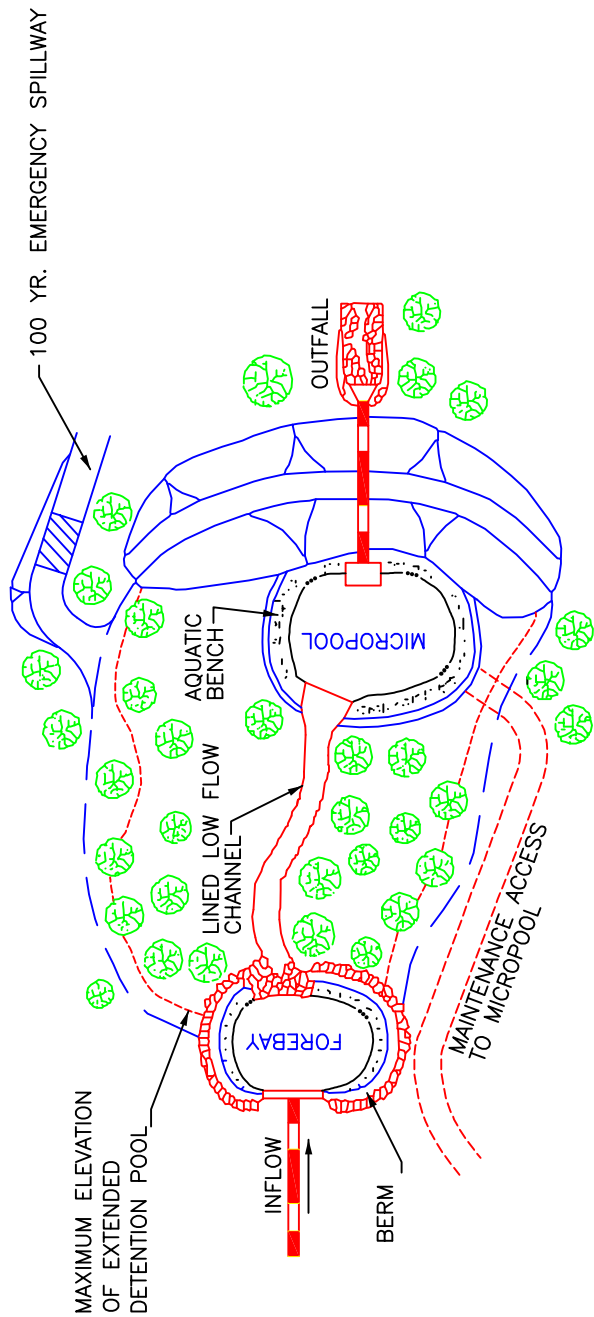
Sediment accumulations in the main pond area shall be monitored and sediment shall be removed when the permanent pool volume has been significantly filled and/or the pond becomes eutrophic.



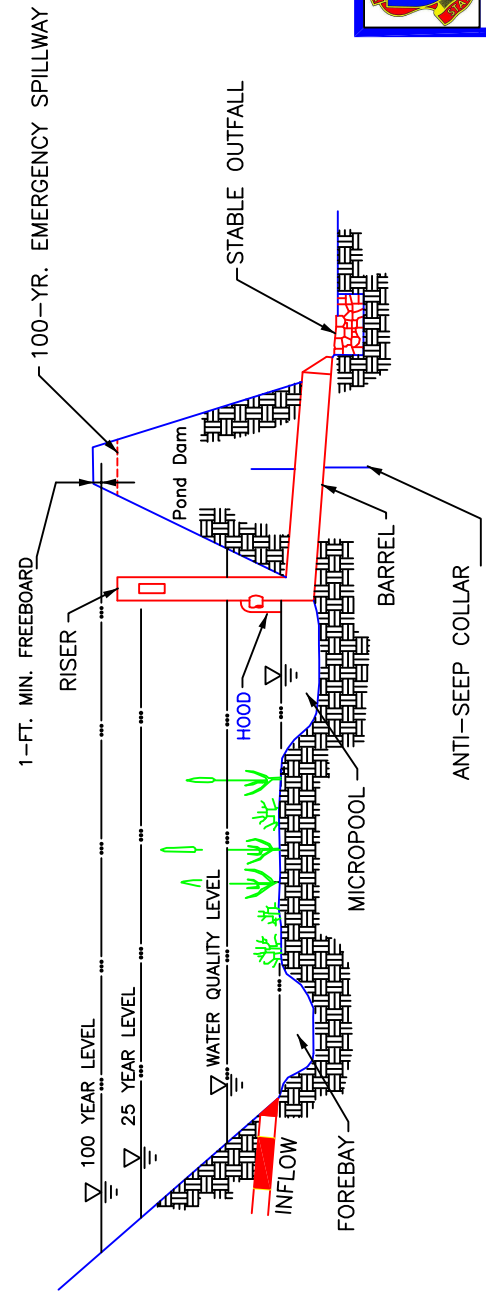
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Land Disturbance Handbook**

WET EXTENDED DETENTION POND

STANDARD DRAWING NO. WQ-02 Page 2 of 2



PLAN VIEW



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Land Disturbance Handbook

MICROPOOL EXTENDED DETENTION POND

STANDARD DRAWING NO. WQ-03 Page 1 of 2

MICROPOOL EXTENDED DETENTION POND

The micropool extended pond is a variation of the wet extended detention pond where only a small "micropool" is maintained at the outlet of the pond. The outlet structure is designed to detain the water quality volume for 24-hours. The micropool prevents re-suspension of previously settled sediments and prevents clogging of the low flow orifice.

Installation:

A forebay shall be provided for all inlets to a micropool extended water quality pond and shall be placed upstream of the micropool area. The forebay is separated from the micropool by a berm that may be constructed of earth, stones, riprap, gabions, or geotextiles. The top of the forebay barrier shall be equal to the normal pool elevation, and may extend above the elevation of the permanent pool. A TRM lined low flow channel shall be constructed to convey flow from the forebay to the micropool area.

The micropool shall be four (4) to six (6) feet in depth.

A low flow orifice shall be installed to slowly release the water quality volume. The low flow orifice shall be protected from clogging by designing appropriate trash guards. Acceptable trash guards include:

Hoods that extend at least 6-inches below the water quality pool water surface elevation.

Reverse flow pipes where the outlet structure inlet is located at least 6-inches below the water quality water surface elevation.

Emergency spillways shall be installed to pass the post-development 100-year 24-hour storm event without overtopping any dam structures.

Inspection and Maintenance:

The side slopes of the pond shall be mowed monthly.

Since decomposing vegetation captured in the wetpond can release pollutants, especially nutrients, it may be necessary to harvest dead vegetation annually. Otherwise the decaying vegetation can export pollutants out of the pond and can cause nuisance conditions to occur.

Debris shall be cleared from all inlet and outlet structures monthly.

All eroded or undercut areas shall be repaired as needed.

A sediment marker shall be placed in the forebay to determine when sediment removal is required.

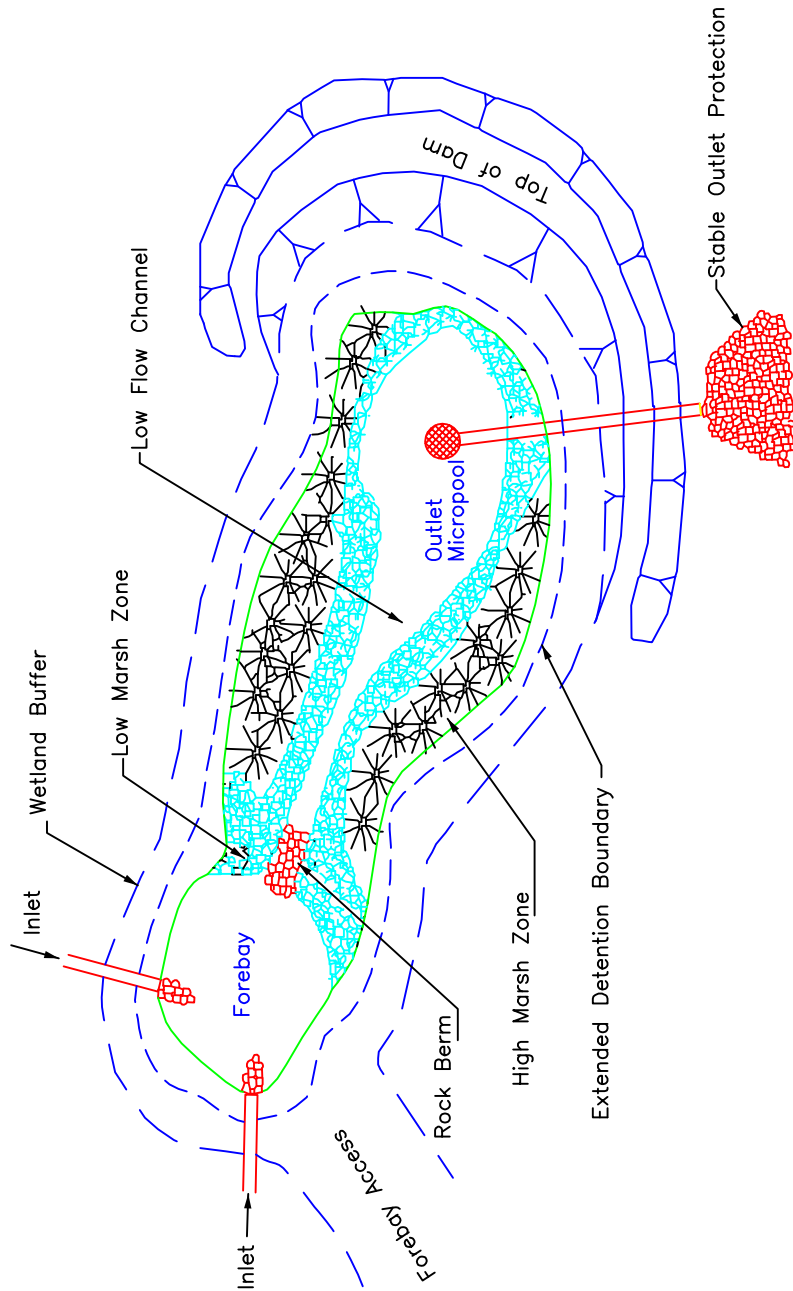
Sediment accumulations in the main pond area shall be monitored and sediment shall be removed when the permanent pool volume has been significantly filled and/or the pond becomes eutrophic.



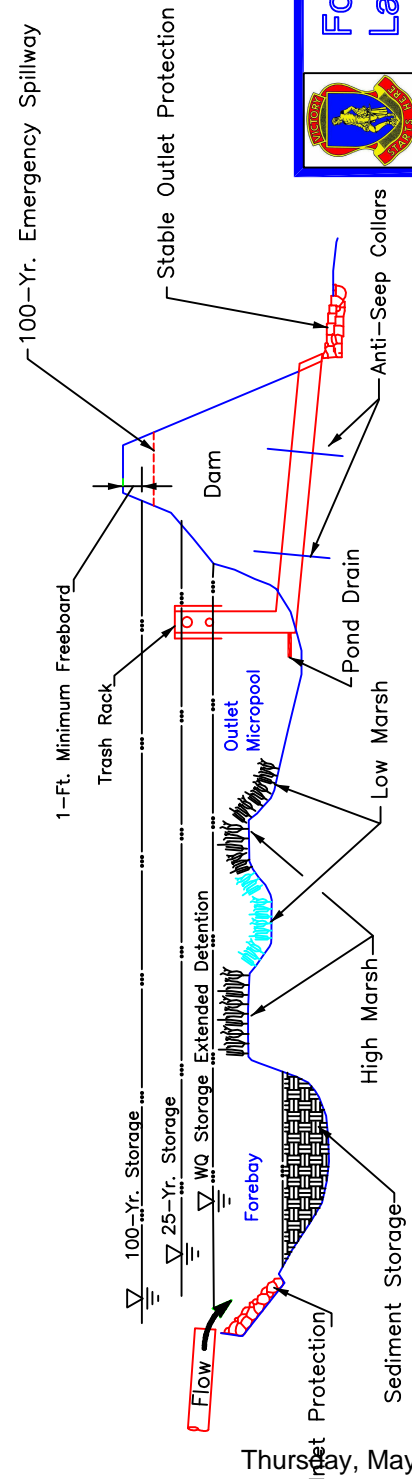
Fort Jackson
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MICROPOOL EXTENDED DETENTION POND

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PLAN VIEW



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Land Disturbance Handbook

STORM WATER WETLAND

STANDARD DRAWING NO. WQ-04 Page 1 of 2

STORM WATER WETLANDWhen and Where to Use It

Constructed shallow marsh system that is designed to treat both urban storm water runoff and control runoff volume. As storm water runoff flows through the wetland, pollutant removal is achieved through settling and uptake by marsh vegetation.

Installation:

One-half (1/2) of the total shallow water zone shall be designated as being a high marsh. This zone extends up from 6–inches below the permanent pool water level (6–inches deep).

One-half (1/2) of the total shallow water zone shall be designated as low marsh. This zone extends from a depth of 18– to 6–inches below the permanent pool water level.

All inlets shall discharge to the forebay, and be protected with a properly designed Turf Reinforcement Mat. The forebay shall be constructed of a rock berm that shall be no lower than one (1)–foot below the water quality pool depth. A lined low flow channel shall be constructed to convey flow from the forebay to the micropool area.

The outlet micropool shall be required to allow adequate depth for the extended detention release outlet to function properly and allow a drain to be installed to drain the wetland when needed. The outlet micropool shall be 4–6 feet deep.

The water quality orifice shall be protected from clogging by incorporating an appropriate trash guard. The trash guard selected shall be durable and extend at least six (6)–inches below the normal pool surface of the wetland.

A principle spillway of the constructed storm water wetland shall be installed to safely pass the 25–year 24–hour storm event. The spillway shall be equipped with a trash rack.

An emergency spillway shall be installed to safely convey discharges resulting from the 100–year 24–hour storm event.

Inspection and Maintenance:

Maintenance requirements for constructed storm water wetlands are particularly high while vegetation is being established. Monitoring during the first year is critical to the success of the wetland. Wetlands shall be monitored after all storm events greater than 2–inches of rainfall during the first year to assess erosion, flow channelization and sediment accumulation. Inspection shall be made at least once every 6–months during the first 3–years of establishment.

A sediment cleanout stake shall be placed in the forebay area to determine when sediment removal is required.

Debris shall be removed from inlet and outlet structure monthly and all eroded or undercut areas repaired as frequently as necessary.

Wetland vegetation shall be monitored and replaced as necessary once every 6–months during the first 3–years of establishment. The depth of the zones within the wetland shall be inspected and maintained annually, and invasive vegetation shall be removed annually.

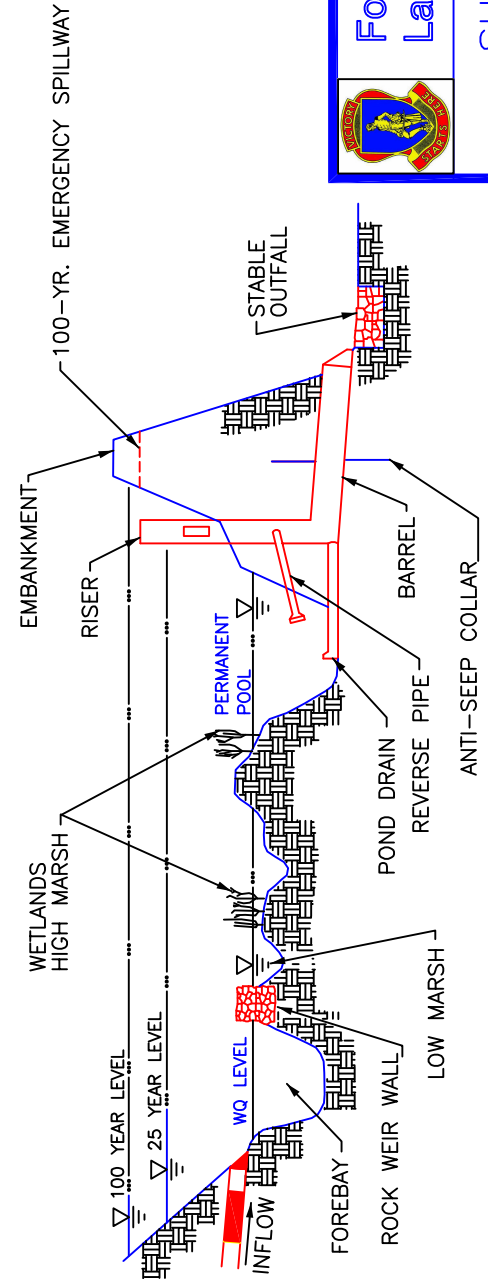
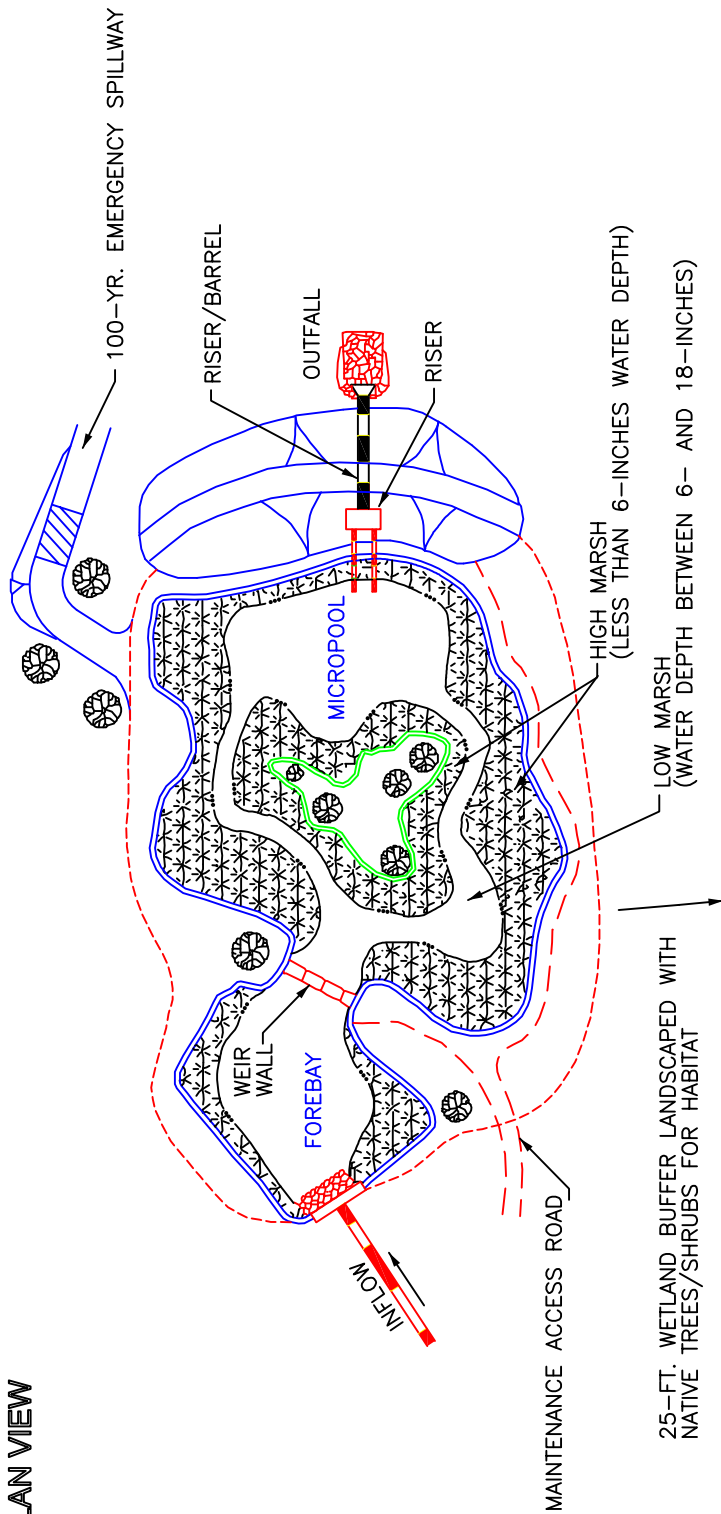


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STORM WATER WETLAND

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SHALLOW WETLAND

SHALLOW WETLAND

When and Where to Use It

Shallow wetlands provide high water quality benefits for urban runoff. A disadvantage of shallow wetlands is that a relatively large amount of land is required to store the desired water quality volume in the low- and high-marsh areas.

Installation:

One-half (1/2) of the total shallow water zone shall be designated as being a high marsh. This zone extends up from 6-inches below the permanent pool water level (6-inches deep).

One-half (1/2) of the total shallow water zone shall be designated as low marsh. This zone extends from a depth of 18- to 6-inches below the permanent pool water level.

All inlets shall discharge to the forebay, and be protected with a properly designed Turf Reinforcement Mat. The forebay shall be constructed of a rock berm that shall be no lower than the water quality pool depth.

The outlet micropool shall be required to allow adequate depth for the extended detention release outlet to function properly and allow a drain to be installed to drain the wetland when needed. The outlet micropool shall be 4-6 feet deep.

The water quality orifice shall be protected from clogging by incorporating an appropriate trash guard. The trash guard selected shall be durable and extend at least six (6)-inches below the normal pool surface of the wetland.

A principle spillway of the constructed storm water wetland shall be installed to safely pass the 25-year 24-hour storm event. The spillway shall be equipped with a trash rack.

An emergency spillway shall be installed to safely convey discharges resulting from the 100-year 24-hour storm event.

Inspection and Maintenance:

Maintenance requirements for constructed storm water wetlands are particularly high while vegetation is being established. Monitoring during the first year is critical to the success of the wetland. Wetlands shall be monitored after all storm events greater than 2-inches of rainfall during the first year to assess erosion, flow channelization and sediment accumulation. Inspection shall be made at least once every 6-months during the first 3-years of establishment.

A sediment cleanout stake shall be placed in the forebay area to determine when sediment removal is required.

Debris shall be removed from inlet and outlet structure monthly and all eroded or undercut areas repaired as needed.

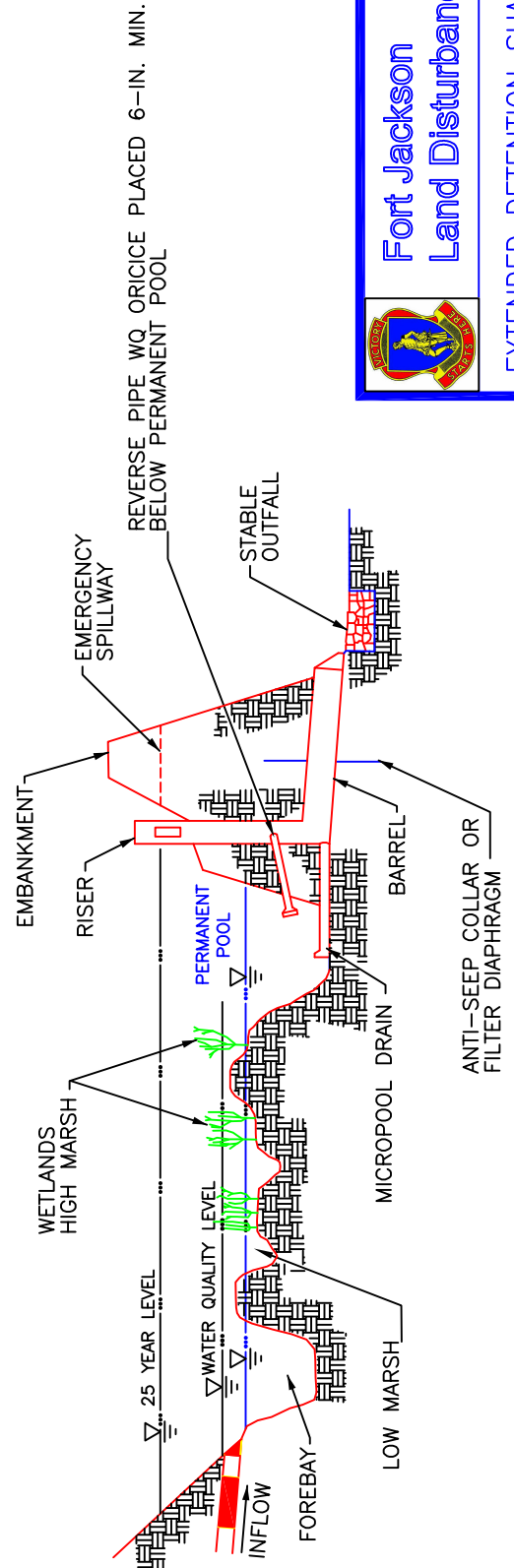
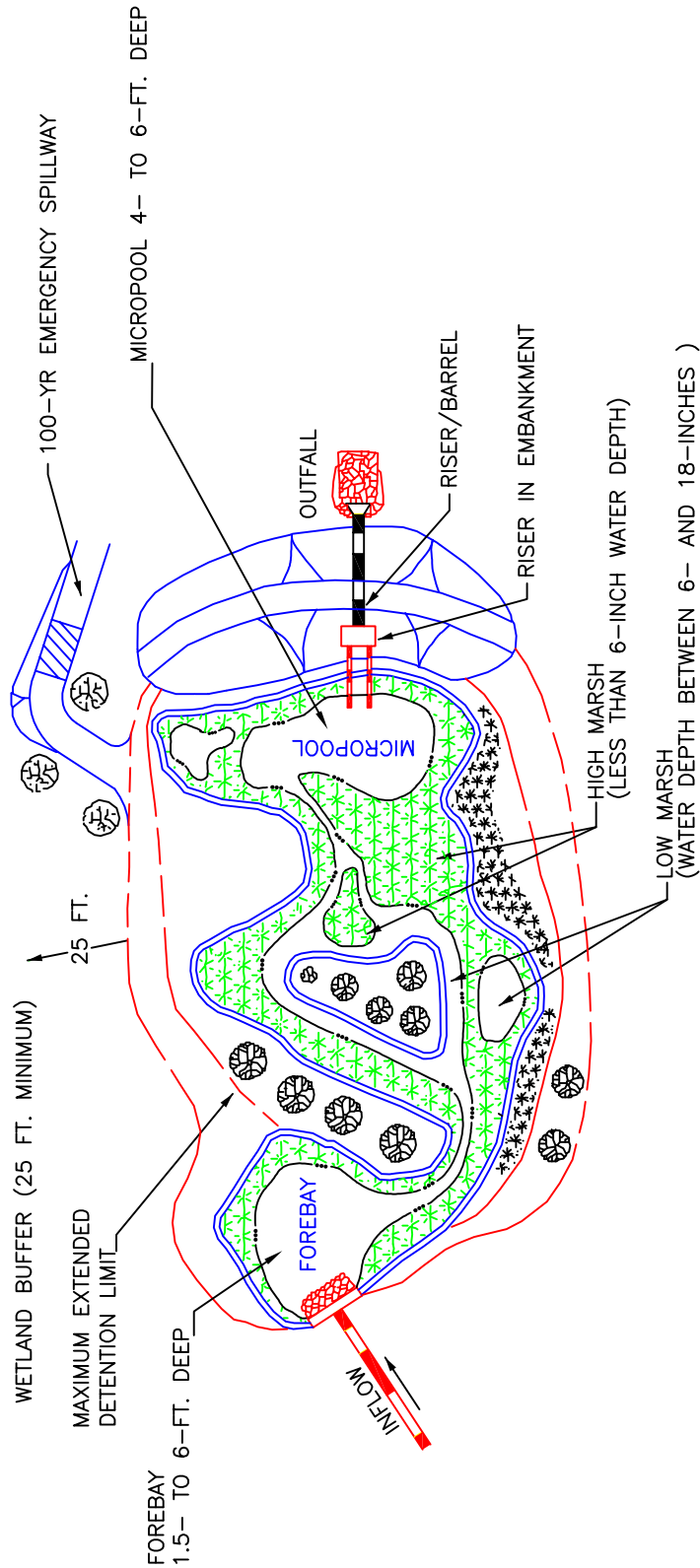
Wetland vegetation shall be monitored and replaced as necessary once every 6-months during the first 3-years of establishment. The depth of the zones within the wetland shall be inspected and maintained annually, and invasive vegetation shall be removed annually.



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SHALLOW WETLAND

STANDARD DRAWING NO. WQ-05 Page 2 of 2



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Land Disturbance Handbook

EXTENDED DETENTION SHALLOW WETLAND

STANDARD DRAWING NO. WQ-06 Page 1 of 2

EXTENDED DETENTION SHALLOW WETLAND

When and Where to Use It

This application can treat a greater volume of storm water in a smaller space than the shallow wetland design because part of the water quality treatment volume is provided as extended detention above the surface of the marsh and is released over a period of 24–hours. Plants that can tolerate both wet and dry periods are required in the extended detention area.

Installation:

One–half (1/2) of the total shallow water zone shall be designated as being a high marsh. This zone extends up from 6–inches below the permanent pool water level (6–inches deep).

One–half (1/2) of the total shallow water zone shall be designated as low marsh. This zone extends from a depth of 18– to 6–inches below the permanent pool water level.

All inlets shall discharge to the forebay, and be protected with a properly designed Turf Reinforcement Mat. The forebay shall be constructed of an earthen berm that shall be no lower than the normal permanent pool depth.

The outlet micropool shall be required to allow adequate depth for the extended detention release outlet to function properly and allow a drain to be installed to drain the wetland when needed. The outlet micropool shall be 4–6 feet deep.

The water quality orifice shall be protected from clogging by incorporating an appropriate trash guard. The trash guard selected shall be durable and extend at least six (6)–inches below the normal pool surface of the wetland.

A principle spillway of the constructed storm water wetland shall be installed to safely pass the 25–year 24–hour storm event. The spillway shall be equipped with a trash rack.

An emergency spillway shall be installed to safely convey discharges resulting from the 100–year 24–hour storm event.

Inspection and Maintenance:

Maintenance requirements are particularly high while vegetation is being established. Monitoring during the first year is critical to the success of the wetland, and should be done after all storm events greater than 2–inches of rainfall to assess erosion, flow channel–ization and sediment accumulation. Inspection shall be made at least once every 6–months during the first 3–years of establishment.

A sediment cleanout stake shall be placed in the forebay area to determine when sediment removal is required.

Debris shall be removed from inlet and outlet structure monthly and all eroded or undercut areas repaired as needed.

Wetland vegetation shall be monitored and replaced as necessary once every 6–months during the first 3–years of establishment. The depth of the zones shall be inspected and maintained annually and invasive vegetation shall be removed annually.

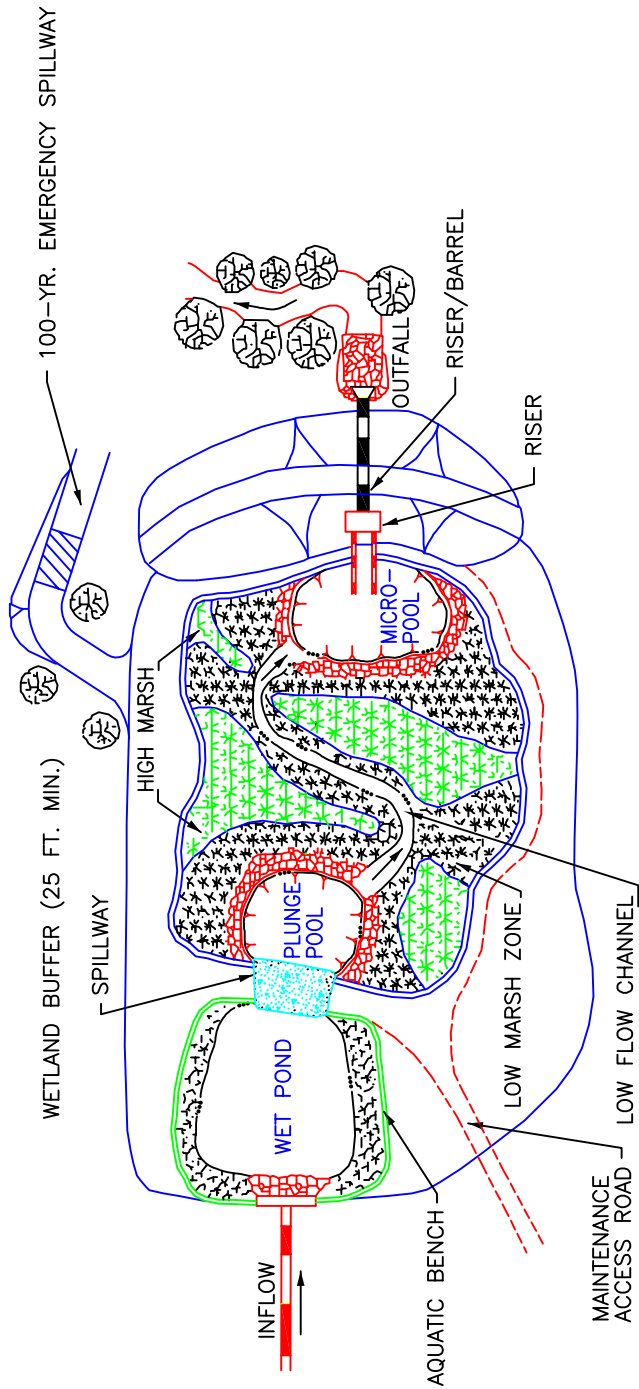


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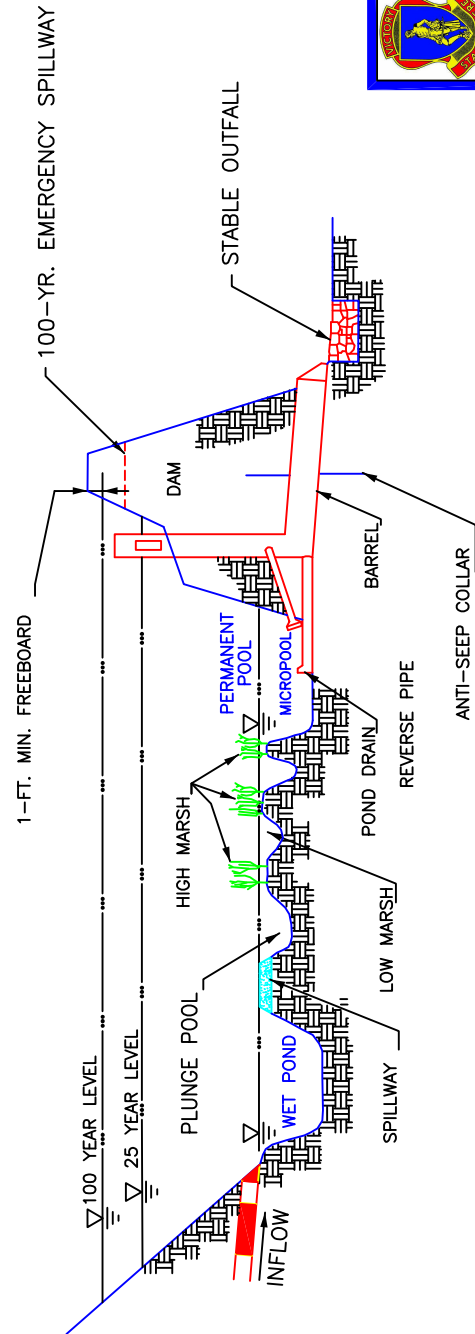
EXTENDED DETENTION SHALLOW WETLAND

STANDARD DRAWING NO. WQ–06 Page 2 of 2

Thursday, May 17, 2018 10:10



PLAN VIEW



PROFILE



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Land Disturbance Handbook

POND/WETLAND SYSTEM

POND/WETLAND SYSTEM

When and Where to Use It

The system has two separate cells, a wet pond and a shallow marsh. The wet pond is designed to trap sediment and reduce runoff velocities before the runoff enters the shallow marsh. The primary water quality benefits are achieved in the shallow wetland. Less land is required for the pond/wetland system than the shallow wetland and the extended detention shallow wetland.

Installation:

One-half ($\frac{1}{2}$) of the total shallow water zone shall be high marsh. This zone extends up from 6-inches below the permanent pool water level (6-in deep). One-half ($\frac{1}{2}$) of the total shallow water zone shall be low marsh. This zone extends from a depth of 18-in to 6-inches below the permanent pool water level.

All inlets shall discharge to wet pond area, and be protected with a Turf Reinforcement Mat or other acceptable inlet protection. The wet pond shall be 4- to 6-feet deep and have a designed overflow spillway that discharges to a plunge pool. The plunge pool shall be 4- to 6-feet deep that having a lined low flow channel to convey flow from the plunge pool to the micropool area.

The outlet micropool shall be required to allow adequate depth for the extended detention release outlet to function properly and allow a drain to be installed to drain the wetland when needed. The outlet micropool shall be 4-6 feet deep.

The water quality orifice shall be protected from clogging by incorporating an appropriate trash guard. The trash guard selected shall be durable and extend at least six (6)-inches below the normal pool surface of the wetland.

A principle spillway of the constructed storm water wetland shall be installed to safely pass the 25-year 24-hour storm event. The spillway shall be equipped with a trash rack.

An emergency spillway shall be installed to safely convey discharges resulting from the 100-year 24-hour storm event.

Inspection and Maintenance:

Maintenance requirements for constructed storm water wetlands are particularly high while vegetation is being established. Monitoring during the first year is critical to the success of the wetland. Wetlands shall be monitored after all storm events > 2-inches of rainfall during the first year to assess erosion, flow channelization and sediment accumulation. Inspection shall be made at least once every 6-months during the first 3-years of establishment.

The sediment cleanout stake shall be placed in the forebay area to determine when sediment removal is required.

Debris shall be removed from inlet and outlet structure monthly and all eroded or undercut areas repaired as needed..

Wetland vegetation shall be monitored and replaced as necessary once every 6-months during the first 3-years of establishment. The depth of the zones shall be inspected and maintained annually, and invasive vegetation shall be removed annually.



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POND/WETLAND SYSTEM

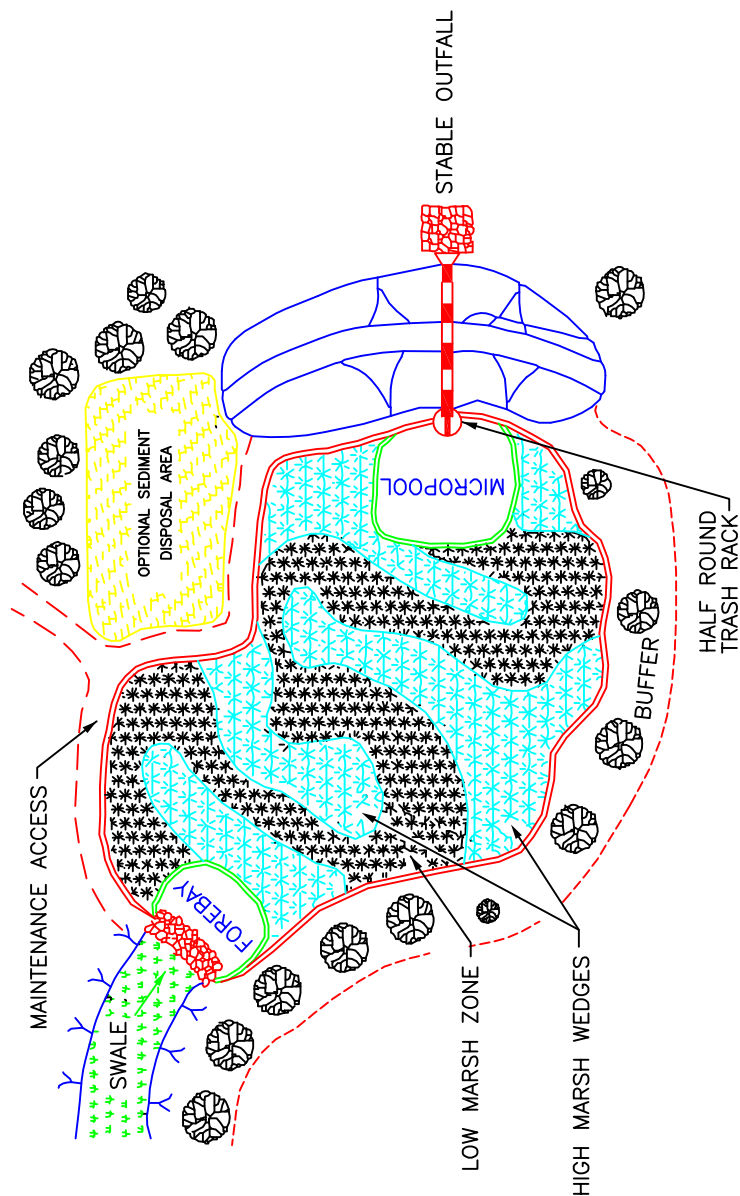
STANDARD DRAWING NO. WQ-07 Page 2 of 2



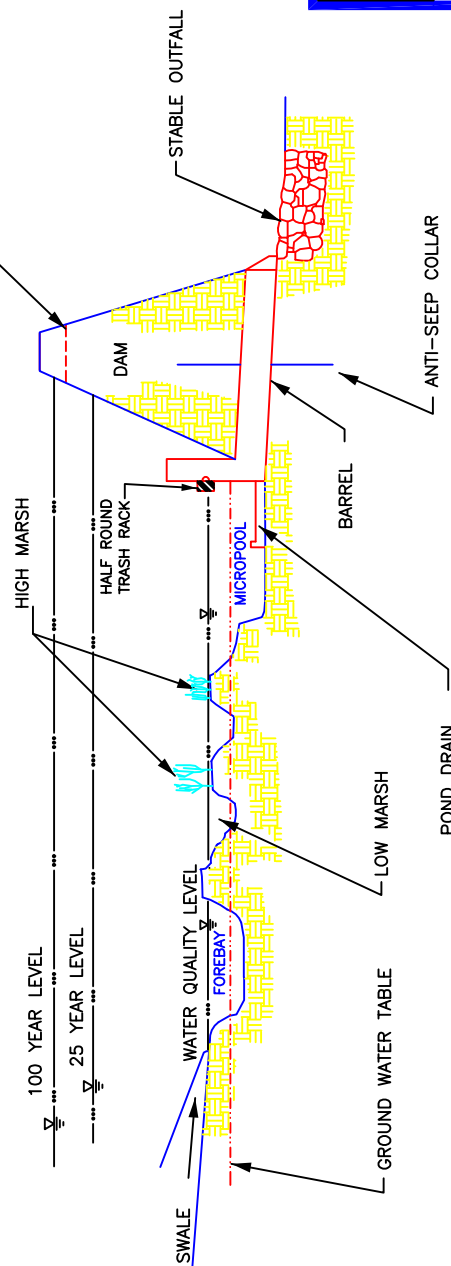
Fort Jackson
Land Disturbance Handbook

POCKET WETLAND

STANDARD DRAWING NO. WQ-08 Page 1 of 2



100-YR. EMERGENCY SPILLWAY



Thursday, May 27, 2010

POCKET WETLAND

When and Where to Use It

A pocket wetland is intended for smaller drainage areas from 5 to 10 acres, and requires excavating down to the water table for a reliable source of water to support the wetland vegetation.

Installation:

One-half ($\frac{1}{2}$) of the total shallow water zone shall be designated as being a high marsh, the other as low marsh. The high zone extends up from 6-inches below the permanent pool water level (6-inches deep). The low marsh extends from a depth of 18- to 6-inches below the permanent pool water level.

All inlets shall discharge to forebay through open vegetated swales. The forebay is separated from the pocket wetland area by barriers or baffles that may be constructed of earth, stones, riprap, gabions, or geotextiles. The top of the forebay shall be equal to or may extend above the water quality permanent pool elevation.

The outlet micropool shall be required to allow adequate depth for the extended detention release outlet to function properly and allow a drain to be installed to drain the wetland when needed. The outlet micropool shall be 4- to 6-feet deep.

The water quality orifice shall be protected from clogging by incorporating an appropriate trash guard. The trash guard selected shall be durable and extend at least six (6)-inches below the normal pool surface of the micropool.

A principle spillway of the constructed storm water wetland shall be installed to safely pass the 25-year 24-hour storm event. The spillway shall be equipped with a trash rack.

An emergency spillway shall be installed to safely convey discharges resulting from the 100-year 24-hour storm event.

Inspection and Maintenance:

Maintenance requirements for constructed storm water wetlands are particularly high while vegetation is being established. Monitoring during the first year is critical to the success of the wetland. Wetlands shall be monitored after all storm events greater than 2-inches of rainfall during the first year to assess erosion, flow channelization and sediment accumulation. Inspection shall be made at least once every 6-months during the first 3-years of establishment.

A sediment cleanout stake shall be placed in the forebay area to determine when sediment removal is required.

Debris shall be removed from inlet and outlet structure monthly and all eroded or undercut areas repaired as needed..

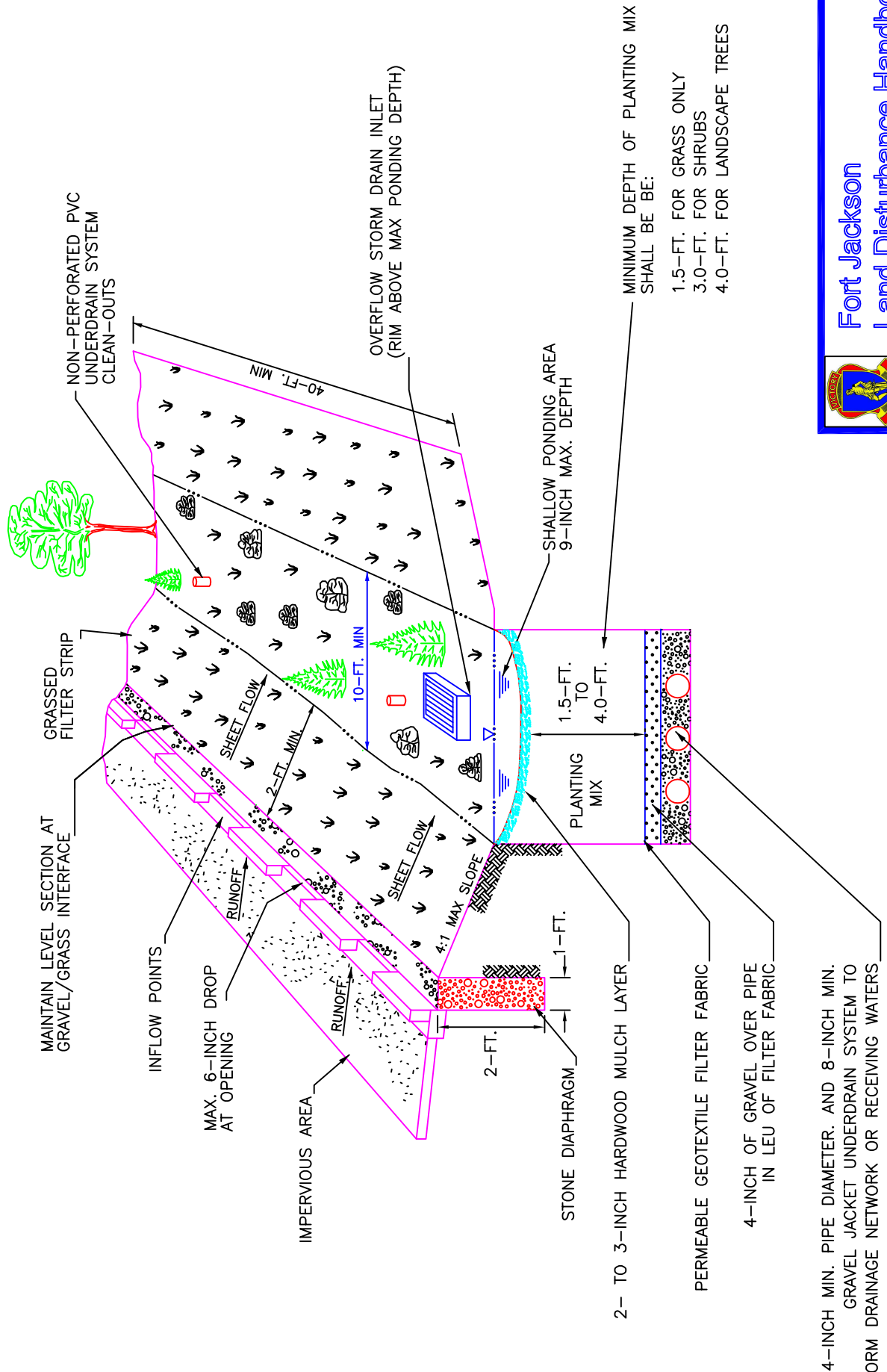
Wetland vegetation shall be monitored and replaced as necessary once every 6-months during the first 3-years of establishment. The depth of the zones shall be inspected and maintained annually, and invasive vegetation shall be removed annually.



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POCKET WETLAND

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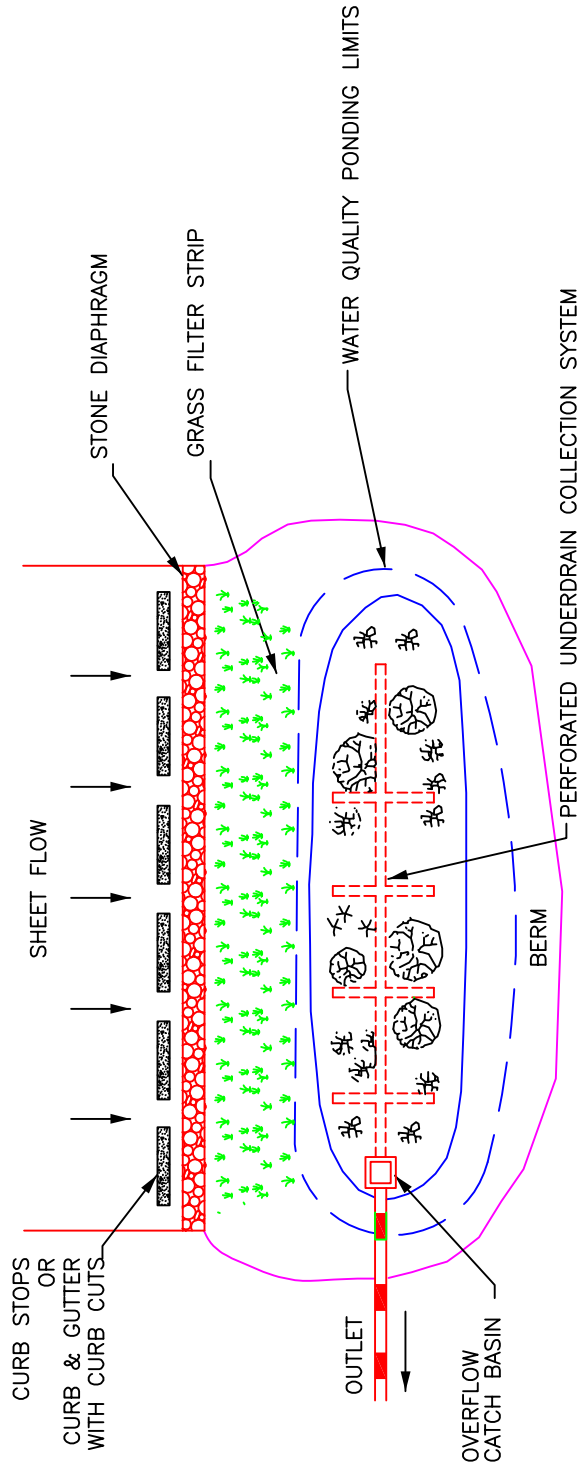


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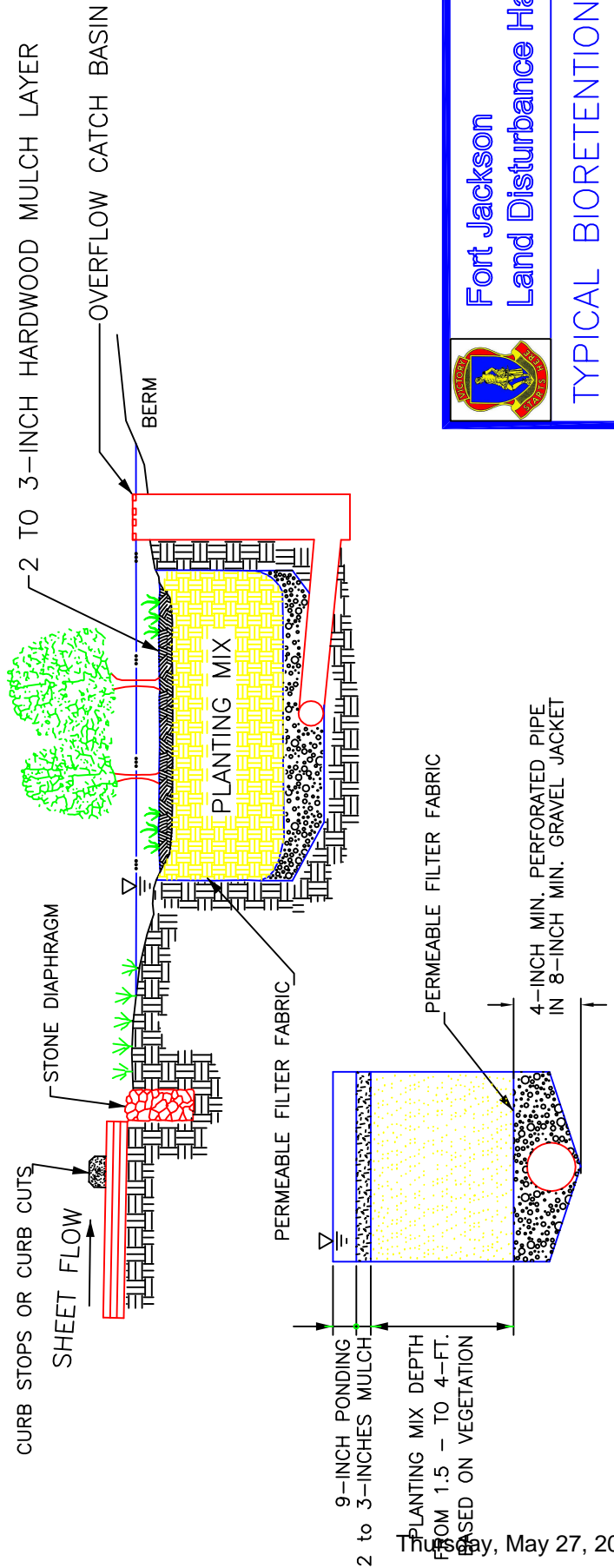
TYPICAL BIORETENTION AREA

STANDARD DRAWING NO. WQ-09 Page 1 of 3

SOURCE: ADAPTED FROM PRINCE GEORGE'S COUNTY DESIGN MANUAL FOR THE USE OF BIORETENTION IN STORMWATER MANAGEMENT, 1993



PLAN VIEW



TYPICAL SECTION



Fort Jackson
Land Disturbance Handbook

TYPICAL BIORETENTION AREA

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TYPICAL BIORETENTION AREA

When and Where to Use It

Bioretention drainage areas should range from 1–2 acres and should only be placed where the contributing area is well stabilized to prevent excessive debris and sediment from collecting in the bioretention area.

Installation:

Bioretention areas work best when constructed off–line, capturing only the water quality volume. Excess runoff shall be diverted away from the bioretention area or should be collected by an overflow catch basin.

The minimum width of the bioretention area shall be ten (10)–feet and the minimum length shall be forty (40)–feet.

The planting mix should be approximately 65–75% sand, 25% silt or topsoil, and 10% organic or leaf compost. The maximum clay content shall be less than 10%. The minimum depth of the planting mix shall be based on the following:

- 1.5–feet for grass only bioretention areas,
- 3.0–feet for bioretention areas that utilize shrubs, and
- 4.0–feet for bioretention areas that utilize trees.

The under drain system shall consist of a minimum 4–inch diameter perforated PVC pipe, an 8–inch minimum gravel jacket filter layer, and geotextiles to separate the piping from the native soils and the gravel from the planting mixture. Several non–perforated PVC pipes shall vertically connect to the under drain pipe and extend to the surface of the planting mix to provide access to clean out the perforated drainage pipe.

An overflow system shall be designed to pass runoff volumes greater than the water quality volume away from the bioretention area. If the bioretention area collects sheet flow from a parking area, a catch basin shall be designed to be at the elevation of the maximum 9–inch ponding depth of the bioretention area to carry the excess runoff from the bioretention area to the storm sewer system or receiving natural water system.

Inspection and Maintenance:

Regular inspection and maintenance is critical to the effective operation of bioretention areas as designed. Maintenance responsibility of the bioretention area shall be vested with a responsible authority by means of a legally binding and enforceable maintenance agreement that is executed as a condition of plan approval.

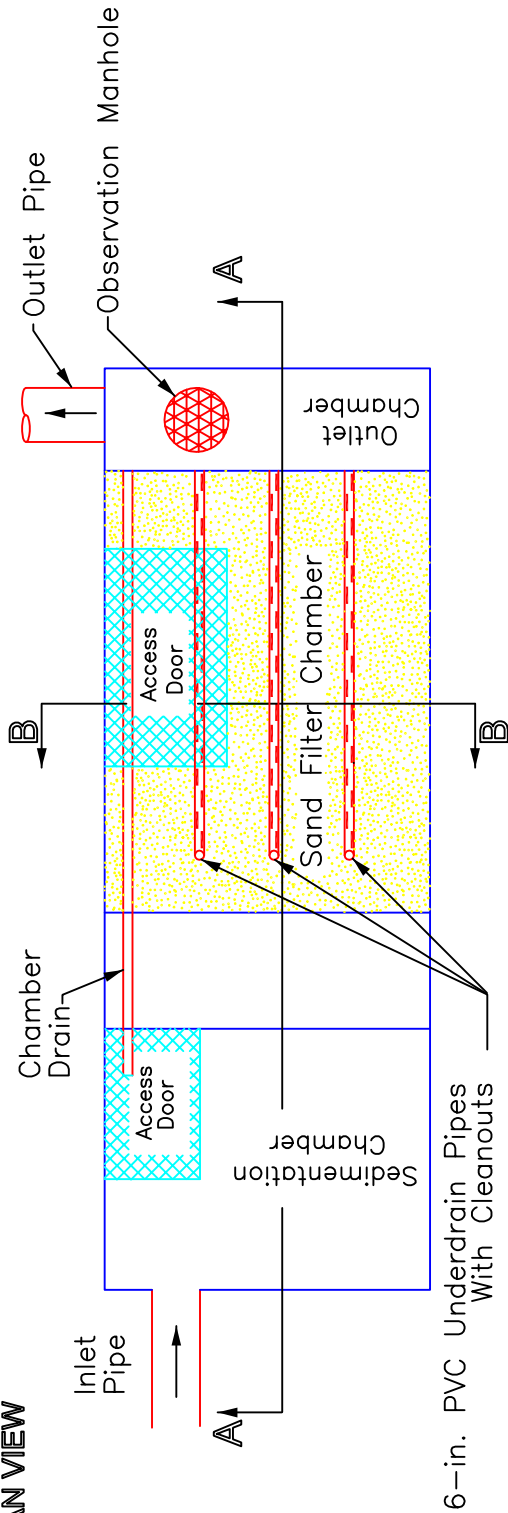
The surface of the ponding area may become clogged with fine sediments over time. Therefore, periodic aeration or cultivating unvegetated areas may be required to ensure adequate infiltration.

Other required maintenance includes but is not limited to:

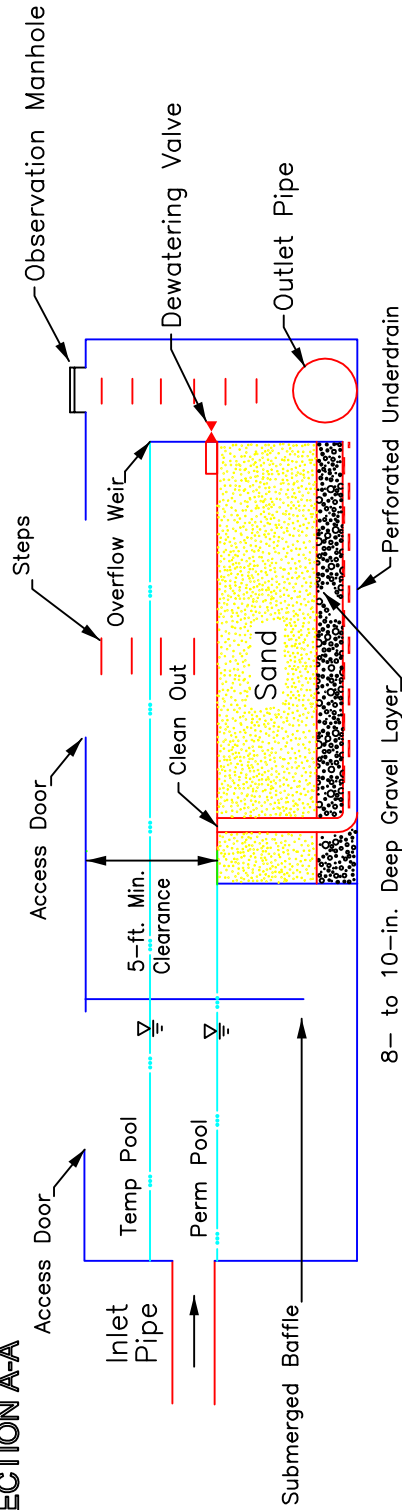
- Pruning and weeding to maintain appearance shall be done periodically as needed.
- Hardwood mulch shall be replaced or replenished 2–to 3–inches thick as needed.
- Brush and debris shall be removed periodically as needed.



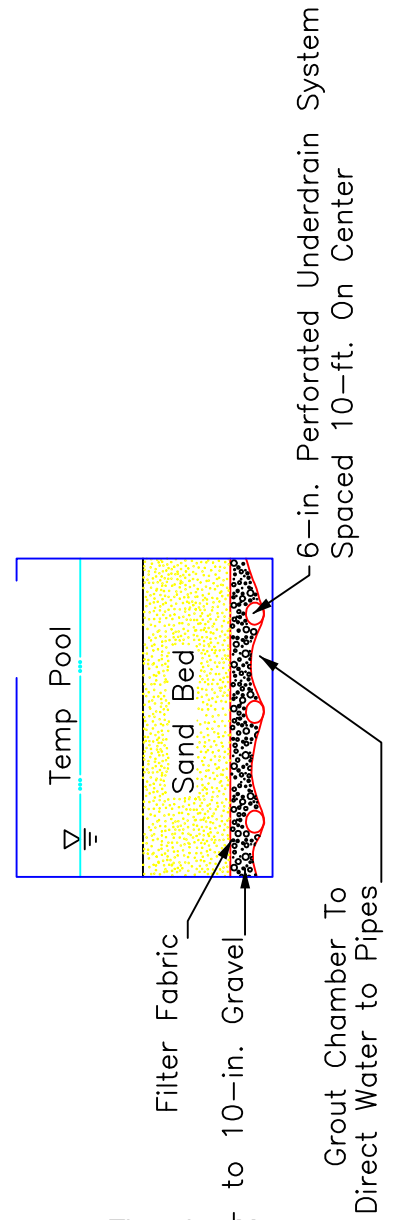
PLAN VIEW



SECTION A-A



SECTION B-B



SAND FILTERS

When and Where to Use It

Sand filtration facilities are most applicable for smaller sites of 5 acres or less where the percent imperviousness of the site is very high. Sand filters shall be used on sites where the drainage area to the facility will remain well stabilized after the construction phase to prevent excess sediment and debris from permanently clogging the filter.

It is recommended that individual sand filters be sized to treat relatively small drainage area of 1 to 2 acres. The implementation of several filters on the site will prevent the entire site from being untreated if one of the filter facilities becomes clogged, requiring maintenance.

Installation:

A 5-foot minimum clearance height shall be provided between the top of the sand bed and the bottom of the concrete slab to provide clearance for maintenance. A de-watering valve shall be placed just above the sand bed layer to drain the facility in situation where the sand filter becomes clogged and requires maintenance.

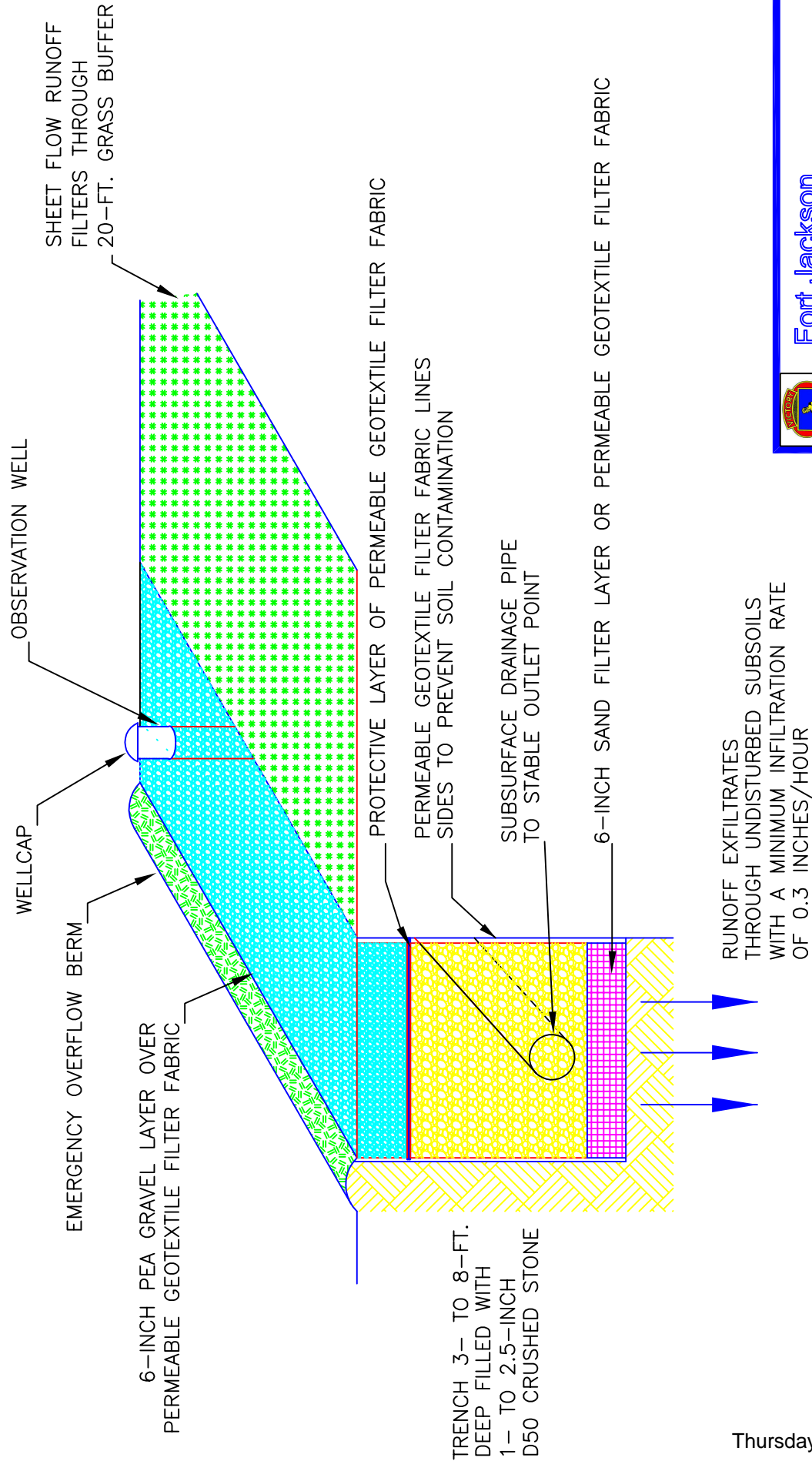
An under drain system shall be used to collect the runoff water that has percolated through the sand filter. The pipe shall be 6-inch perforated schedule 40 PVC piping placed in a 8- to 10-inch deep gravel jacket. A permeable geotextile filter fabric that meets Fort Jackson specifications shall be placed between the sand and the gravel. To ensure adequate drainage, the bottom chamber shall be sloped towards the under drain pipes that shall be spaced 10-feet apart along the filter bed. The under drain system may discharge to the main storm sewer system or may outfall to an outlet chamber.

Inspection and Maintenance:

Regular inspection and maintenance is critical to the effective operation of sand filter facilities as designed. Maintenance responsibility for the sand filter shall be vested with a responsible authority by means of a legally binding and enforceable maintenance agreement that is executed as a condition of plan approval. Typical maintenance responsibilities include clearing debris and trash from all inlet and outlet structures monthly, removing trash and debris from the sediment chamber monthly, and removing all sediment from the sediment chamber annually.

A record shall be kept of the average de-watering time of the sand filter facility to determine if maintenance is required. When the filtering capacity of the sand has diminished, the top layers of the sand (2- to 3-inches) shall be removed and replaced. This typically will need to be done every 3- to 5-years.





INFILTRATION TRENCH

When and Where to Use It

Infiltration trenches are limited to areas with highly porous soils where the water table and or bedrock are located well below the bottom of the trench. The maximum drainage area for any one-infiltration trench shall be 5 acres. Infiltration trenches shall not be used for manufacturing and industrial sites where there is potential for high concentrations of soluble pollutants and heavy metals.

Installation:

The minimum depth of the excavated trench shall be 3-feet, the maximum depth shall be 8-feet, and the trench shall be lined with a permeable filter fabric.

The maximum width of the infiltration trench shall be twenty-five (25)-feet.

The trench excavation shall be limited to the width a depth specified in the design. Excavated material should be placed away from the open trench. The bottom of the excavated trench shall not be loaded or compacted, and should be scarified before the placement of sand or filter fabric. The sides of the trench shall be trimmed of all large roots. The sidewalls should be uniform with no voids and scarified prior to the installation of the protective filter fabric.

A 6-inch sand filter shall be located on the bottom of the trench.

The stone fill media shall consist of 1.0- to 2.5- inch D50 crushed stone with 6-inches of pea gravel located on top separated by a permeable filter fabric. This filter fabric prevents should be easily separated from the geotextiles that protect the sides of the excavated trench.

Observation wells a maximum of 100-ft apart shall be installed in every infiltration trench and shall be made of 4- to 6-inch PVC pipe. The well shall extend to the bottom of the trench. The observation well shall be installed along the centerline of the trench, and be flush with the ground elevation of the trench. The top of the well shall be capped and locked to discourage vandalism and tampering.

Inspection and Maintenance:

Regular inspection and maintenance is critical to the effective operation of infiltration trenches as designed. Maintenance responsibility shall be vested with a responsible authority by means of a legally binding and enforceable maintenance agreement that is executed as a condition of the SC DHEC Storm Water Management Permit approval.

A record shall be kept of the average de-watering time of the infiltration trench to determine if maintenance is required.

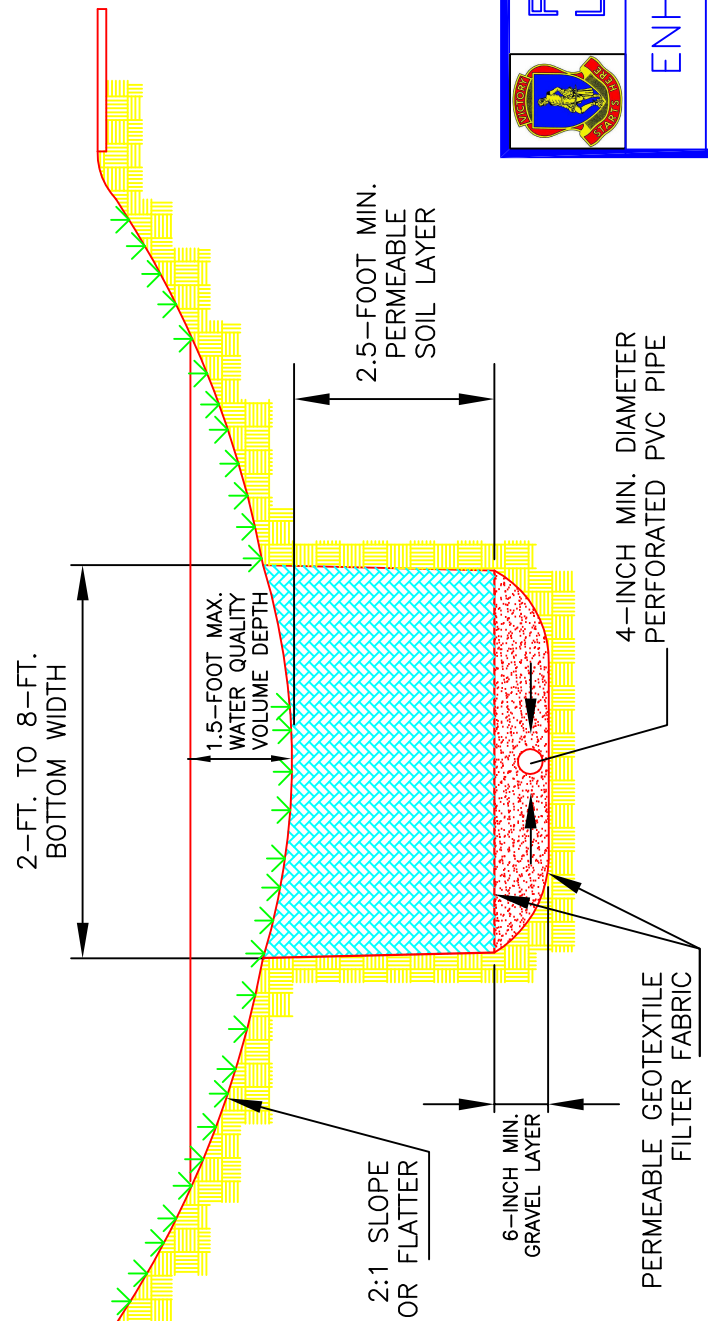
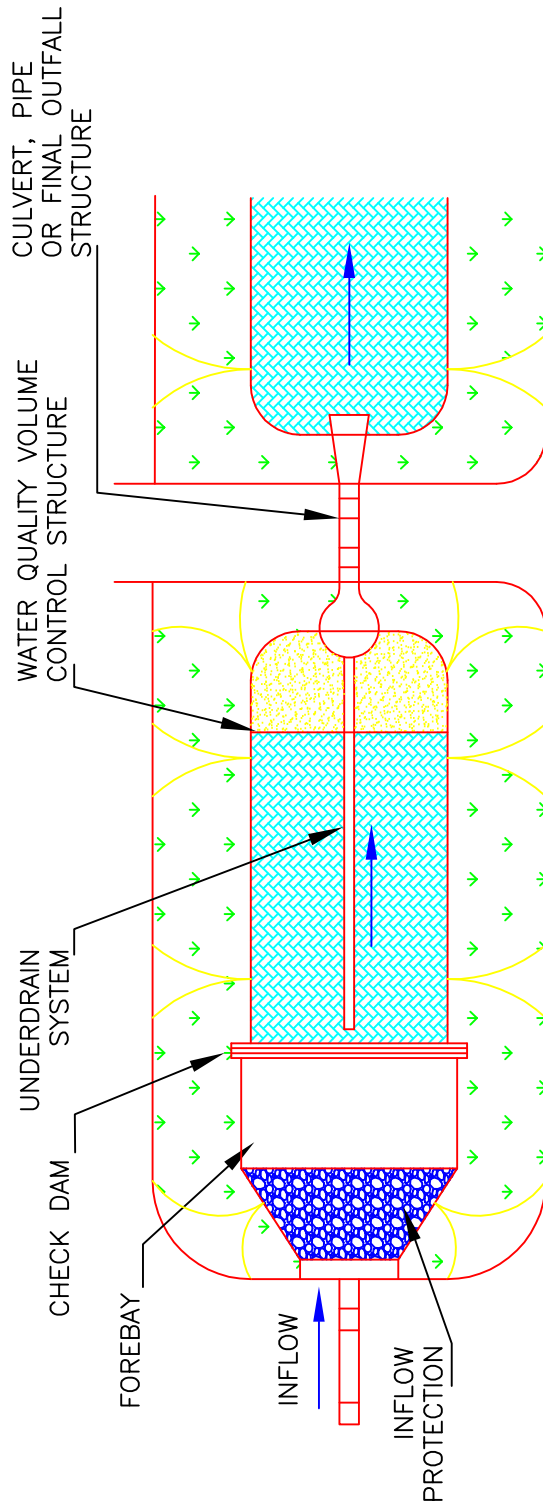
Debris and trash shall be cleared from all inlet and outlet structures monthly. Trees, shrubs, or invasive vegetation shall be removed semi-annually.

The top 6-inch layer of pea gravel and the geotextile separating the pea gravel from the stone media serve as a sediment barrier and will be required to be replaced when full of sediment.

The observation well shall be checked following 72 hours (3-days) of dry weather after a rainfall event. If complete de-watering is not observed, there may clogging and proper maintenance shall be performed.

In complete failure is observed, total rehabilitation of the trench shall be performed by excavating the trench walls to expose clean soil, and replacing the sand, filter media, gravel, and geotextiles.





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Land Disturbance Handbook

ENHANCED DRY SWALE

STANDARD DRAWING NO. WQ-12 Page 1 of 2

ENHANCED DRY SWALE

When and Where to Use It

Enhanced swales are primarily applicable in moderate to large lot residential developments and industrial areas with low to moderate density where the impervious cover (parking lots and rooftops) of the contributing drainage areas is relatively small. Enhanced swale should have a contributing drainage area less than 5 acres. Enhanced swales are also useful along rural roads and highways that have driveway entrances crossing over the swale.

Installation:

Swale slopes should be limited between 1 and 2 %, unless site topography dictates larger slopes. In this instance, drop structures may be placed in the swale to limit the slope of a particular section of the swale. Spacing between drop structures should be a minimum of 50–feet and energy dissipation techniques may need to be added on the downstream side of the drop structures.

The overall depth of the water quality runoff volume detained in the channel shall not exceed 1.5–feet.

The bottom width of the swale should range between 2– and 8–feet where applicable to ensure an adequate filtration area

The side slopes of the swale shall not exceed 2H:1V, and 4H:1V is recommended for ease of maintenance and for side inflow to remain as sheet flow.

The filter bed for an enhanced dry swale shall consist of a permeable soil layer at least 2.5–feet deep. The drainage pipe shall be a minimum 4–inch diameter perforated PVC pipe (AASHTO M 252) in a 6–inch gravel layer.

Inspection and Maintenance:

The surface of the filter bed may become clogged with fine sediments over time. Light core aeration may be required to ensure adequate filtration. Other required maintenance includes but is not limited to periodic mowing to maintain the storage volume and to maintain appearance, and the periodic removal of trash and debris as needed.



PARKING LOT BIORETENTION ISLANDS

Installation

The top width should be a minimum of 10—feet, and the depth should be at least 6—inches.

The slopes from the pavement into the island should be 2%.

Bioretention area shall be planted once all construction has ceased. Prior to planting, all debris and sediment that has collected in basin during construction shall be removed.

Minimize construction traffic over areas where bioretention areas are planned.

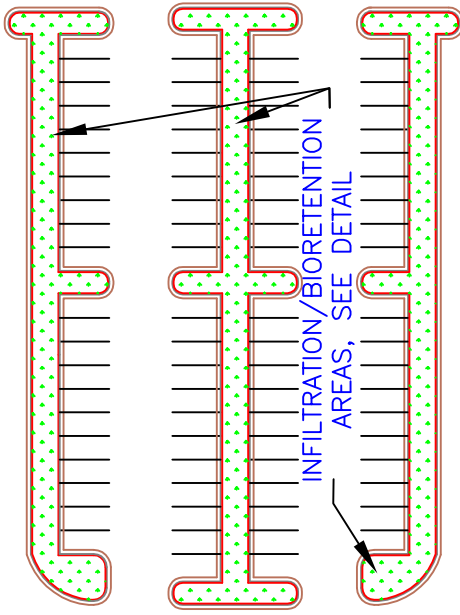
Specification of bioretention soils and plants is provided in other documents of the Fort Jackson Land Disturbance Handbook, specifically, Standard Drawing WQ 09.

Inspection and Maintenance:

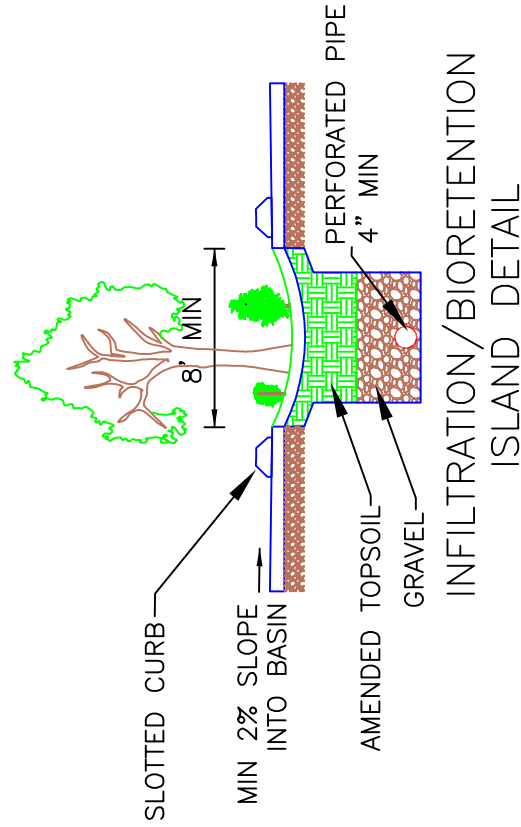
Islands should be inspected, every seven (7) calendar days and within 24—hours after each rainfall event that produces $\frac{1}{2}$ —inches or more of precipitation and repairs made as necessary.

Damage caused by construction traffic or other activity must be repaired before the end of each working day.

All plantings shall be replaced once every 2—3 years as necessary.



PARKING LOT SCHEMATIC WITH
BIORETENTION ISLANDS



Fort Jackson
Land Disturbance Handbook

PARKING LOT
BIORETENTION AREA

STANDARD DRAWING NO. WQ-13 Page 1 of 1

BMP Standard Notes

When and Where to Use It

These notes should appear on any design drawing that proposes using any type of structural BMPs. Additional information on any proposed BMP should be included in detail drawing(s). Fort Jackson encourages the use of various types of BMPs, provided sufficient detail and appropriateness of use is given.

BMP Notes:

All proposed BMPs shall have accompanying drawings, design calculations, and any other necessary information.

All proposed BMPs shall be installed as directed by the design drawings. The use of the proper material, technique, and timing are crucial to a BMP that will provide the expected level and of control.

All proposed BMPs shall be maintained as directed by the design drawings. All maintenance requirements will be conducted by Fort Jackson. Fort Jackson expects that all BMPs be performing as designed prior to beginning any activities.



Fort Jackson
Land Disturbance Handbook

BMP STANDARD NOTES

STANDARD DRAWING NO. WQ-14 Page 1 of 1

APPENDIX G

USGS Regression Equations for Central South Carolina

USGS Regression Equations for Rural and Urban Areas in South Carolina

Rural

$$Q_{R,2} = 25 * A^{0.74}, \quad \text{Equation 1}$$

$$Q_{R,5} = 44 * A^{0.72}, \quad \text{Equation 2}$$

$$Q_{R,10} = 59 * A^{0.71}, \quad \text{Equation 3}$$

$$Q_{R,25} = 80 * A^{0.70}, \quad \text{Equation 4}$$

$$Q_{R,50} = 97 * A^{0.70}, \quad \text{Equation 5}$$

$$Q_{R,100} = 116 * A^{0.69}, \text{ and} \quad \text{Equation 6}$$

$$Q_{R,500} = 179 * A^{0.66}, \quad \text{Equation 7}$$

where

$Q_{R,N}$ = peak discharge resulting from a storm event with a recurrence interval of N from rural area and

A = contributing area in square miles.

The above equations are valid only in the Upper Coastal Plains of South Carolina. Fort Jackson is considered to lie entirely within this region of the state.

Urban

$$Q_{I,2} = 1.36 * A^{0.554} * IA^{1.24} * Q_{R2}^{0.323}, \quad \text{Equation 8}$$

$$Q_{I,5} = 2.58 * A^{0.544} * IA^{1.170} * Q_{R5}^{0.299}, \quad \text{Equation 9}$$

$$Q_{I,10} = 3.77 * A^{0.536} * IA^{1.115} * Q_{R10}^{0.291}, \quad \text{Equation 10}$$

$$Q_{I,25} = 5.84 * A^{0.524} * IA^{1.041} * Q_{R25}^{0.284}, \quad \text{Equation 11}$$

$$Q_{I,50} = 7.76 * A^{0.514} * IA^{0.987} * Q_{R50}^{0.283}, \quad \text{Equation 12}$$

$$Q_{I,100} = 10.4 * A^{0.506} * IA^{0.932} * Q_{R100}^{0.28}, \text{ and} \quad \text{Equation 13}$$

$$Q_{I,500} = 18.8 * A^{0.484} * IA^{0.800} * Q_{R500}^{0.281}, \quad \text{Equation 14}$$

where

$Q_{I,N}$ = peak discharge resulting from a storm event with a recurrence interval of N from urban areas,

A = contributing area in square miles,

IA = impervious area in square miles, and

$Q_{R,N}$ = peak discharge resulting from a storm event with a recurrence interval of N from rural areas using the rural equations (equations 1 – 7).

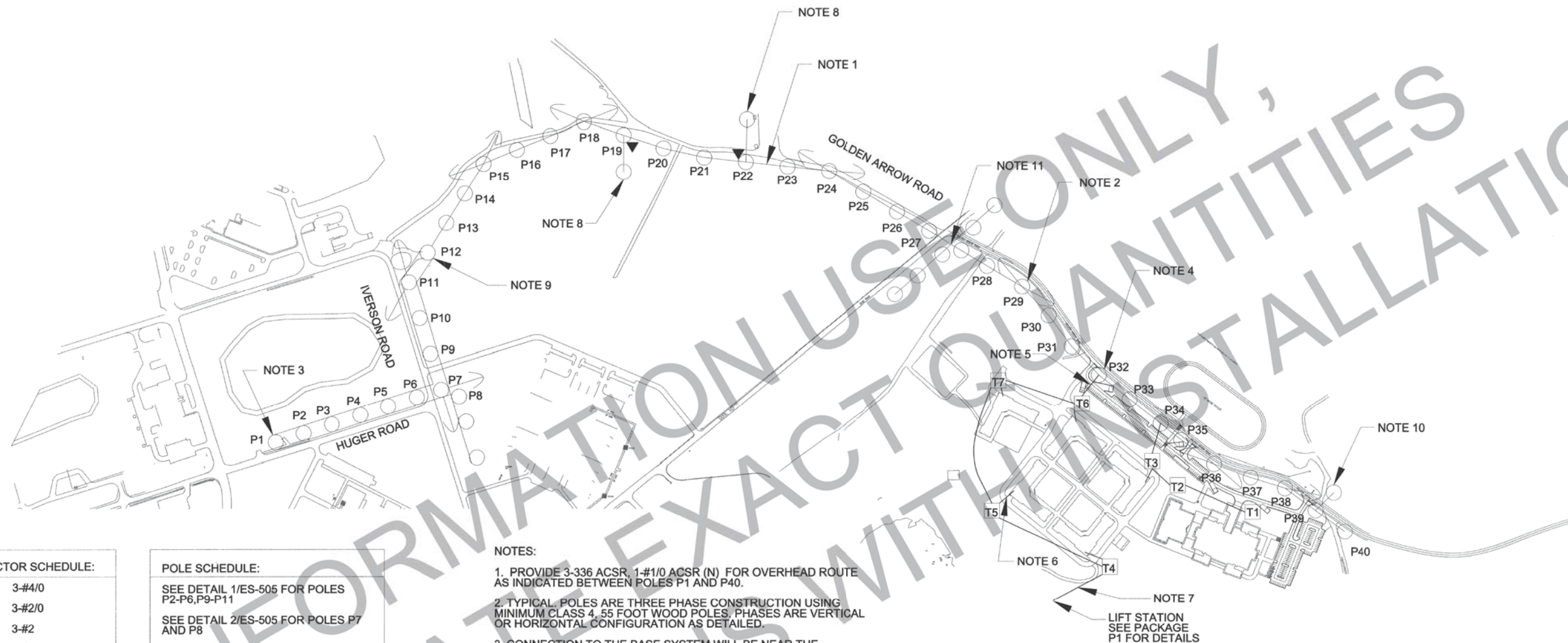
APPENDIX H

NPDES Phase II Permit

(to be inserted when issued by SCDHEC)

APPENDIX FF

BTC 2 SITE ELECTRICAL AND COMMUNICATIONS UTILITY DRAWINGS



CONDUCTOR SCHEDULE:

P32 - T6	3-#4/0
T6 - T7	3-#2/0
T7 - T5	3-#2
T5 - T4	3-#2
P34 - T3	3-#4/0
T3 - T2	3-#2
T2 - T1	3-#2

POLE SCHEDULE:

SEE DETAIL 1/ES-505 FOR POLES P2-P6, P9-P11

SEE DETAIL 2/ES-505 FOR POLES P7 AND P8

SEE DETAIL 3/ES-505 FOR VERTICAL TO HORIZONTAL TRANSITION AT POLES P12 AND P13

SEE DETAIL 5/ES-501 FOR POLES P14, P16, P17, P20, P21, P23, P25-P28, P30, P31, P33, P35, P37, P38

SEE DETAIL 5/ES-501 AND DETAIL 1/ES-502 FOR POLES P15, P18, P24, P29, P36, P38

SEE DETAIL 3/ES-502 FOR POLES P32 AND P34

SEE DETAIL 6/ES-505 FOR POLES P19 AND P22

TRANSFORMER SCHEDULE:

T1	1500KVA	8,320/4,800V-208/120V, 3Ø, D-Y * ESTIMATED
T2	500KVA	8,320/4,800V-208/120V, 3Ø, D-Y * ESTIMATED
T3	750KVA	8,320/4,800V-208/120V, 3Ø, D-Y
T4	750KVA	8,320/4,800V-208/120V, 3Ø, D-Y
T5	750KVA	8,320/4,800V-208/120V, 3Ø, D-Y
T6	750KVA	8,320/4,800V-208/120V, 3Ø, D-Y
T7	750KVA	8,320/4,800V-208/120V, 3Ø, D-Y

NOTES:

1. PROVIDE 3-336 ACSR, 1-#1/0 ACSR (N) FOR OVERHEAD ROUTE AS INDICATED BETWEEN POLES P1 AND P40.
2. TYPICAL POLES ARE THREE PHASE CONSTRUCTION USING MINIMUM CLASS 4, 55 FOOT WOOD POLES. PHASES ARE VERTICAL OR HORIZONTAL CONFIGURATION AS DETAILED.
3. CONNECTION TO THE BASE SYSTEM WILL BE NEAR THE INTERSECTION OF HUGER ROAD AND JACKSON BLVD. VERIFY WITH POST DPW THE EXACT METHOD OF THE TIE IN.
4. OVERHEAD TO UNDERGROUND TRANSITION AT POLE P32 AND P34 WILL PROVIDE SERVICE TO THE NEW PROJECT SITE. PROVIDE A THREE PHASE ARRANGEMENT WITH CUTOUTS AND LIGHTNING ARRESTORS AT POLE P32 AND P34.
5. UNDERGROUND DUCTBANK TO TRANSFORMERS ARE TWO 4-INCH CONDUIT WITH ONE CONDUIT BEING THE SPARE. CONCRETE ENCASE WHERE THE DUCTBANK PASSES UNDER PAVED OR VEHICLE AREAS. SEE DETAIL 3 SHEET ES-503. CONDUCTORS ARE SIZED AS SCHEDULED AND SHALL BE TYPE MV-105, 133%, 15KV RATED WITH CONCENTRIC NEUTRALS
6. TYPICAL, SEE DETAIL 2 SHEET ES-503 FOR SECONDARY DUCTBANK.
7. TAP TRANSFORMER T4 TO FEED LIFT STATION.
8. SECONDARY EXISTING OVERHEAD SERVICE TO EXISTING POLE INDICATED TO BE RESTORED. INDICATED TRANSFORMER TO BE REINSTALLED AND CONNECTED TO NEW SERVICE ON NEW POLE.
9. SEE DETAIL 3/ES-505 FOR VERTICAL TO HORIZONTAL TRANSITION
10. PROVIDE SINGLE PHASE OVERHEAD SERVICE TO ENDURANCE COURSE SERVICE CONNECTION. SIZE TO MATCH EXISTING OVERHEAD SERVICE, CONNECT TO EXISTING POLE.
11. LOWER EXISTING SINGLE PHASE LINE TO NEW CROSS MEMBER. NEW SERVICE WILL CROSS OVER TOP OF EXISTING SERVICE.
12. TYPICAL FOR POLES P14-P27: THERE ARE A NUMBER OF EXISTING FLOOD LIGHTS ON THE POLES TO BE REMOVED. RELOCATED AND RECONNECT EXISTING FLOOD LIGHTS ON NEW POLES.



US Army Corps
of Engineers



Revisions	Symbol	Description	Date	Appr.

Designed by: BROWNING	Date: 29 MAY 2009
Drawn by: MULLKEY	Scale: 1"=300'-0"
Checked by: COLEMAN/CHAMBER	Drawing code:
Project Engineer/Inspector:	Date:



SITE POWER

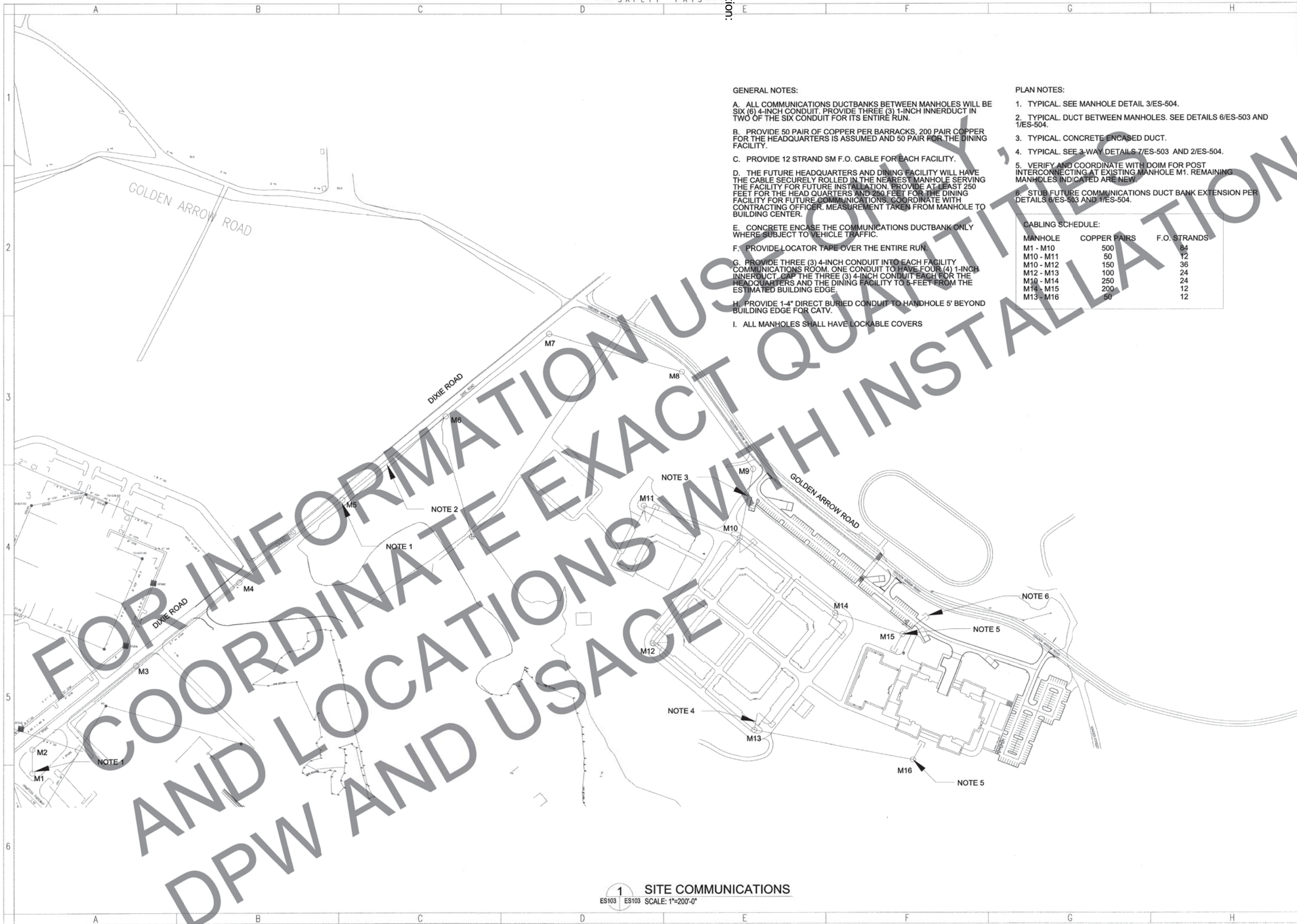
BASIC TRAINING COMPLEX II
B/COF
FT. JACKSON, SOUTH CAROLINA
W9126G-09-D-007

File Name:
Sheet Number:
ES-102
Sheet 426 Of

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SAFETY PAYS

Section:



GENERAL NOTES:

- A. ALL COMMUNICATIONS DUCTBANKS BETWEEN MANHOLES WILL BE SIX (6) 4-INCH CONDUIT. PROVIDE THREE (3) 1-INCH INNERDUCT IN TWO OF THE SIX CONDUIT FOR ITS ENTIRE RUN.
- B. PROVIDE 50 PAIR OF COPPER PER BARRACKS, 200 PAIR COPPER FOR THE HEADQUARTERS IS ASSUMED AND 50 PAIR FOR THE DINING FACILITY.
- C. PROVIDE 12 STRAND SM F.O. CABLE FOR EACH FACILITY.
- D. THE FUTURE HEADQUARTERS AND DINING FACILITY WILL HAVE THE CABLE SECURELY ROLLED IN THE NEAREST MANHOLE SERVING THE FACILITY FOR FUTURE INSTALLATION. PROVIDE AT LEAST 250 FEET FOR THE HEAD QUARTERS AND 250 FEET FOR THE DINING FACILITY FOR FUTURE COMMUNICATIONS. COORDINATE WITH CONTRACTING OFFICER. MEASUREMENT TAKEN FROM MANHOLE TO BUILDING CENTER.
- E. CONCRETE ENCASE THE COMMUNICATIONS DUCTBANK ONLY WHERE SUBJECT TO VEHICLE TRAFFIC.
- F. PROVIDE LOCATOR TAPE OVER THE ENTIRE RUN.
- G. PROVIDE THREE (3) 4-INCH CONDUIT INTO EACH FACILITY COMMUNICATIONS ROOM. ONE CONDUIT TO HAVE FOUR (4) 1-INCH INNERDUCT. CAP THE THREE (3) 4-INCH CONDUIT EACH FOR THE HEADQUARTERS AND THE DINING FACILITY TO 5-FEET FROM THE ESTIMATED BUILDING EDGE.
- H. PROVIDE 1-4" DIRECT BURIED CONDUIT TO HANDHOLE 5' BEYOND BUILDING EDGE FOR CATV.
- I. ALL MANHOLES SHALL HAVE LOCKABLE COVERS

PLAN NOTES:

1. TYPICAL. SEE MANHOLE DETAIL 3/ES-504.
2. TYPICAL. DUCT BETWEEN MANHOLES. SEE DETAILS 6/ES-503 AND 1/ES-504.
3. TYPICAL. CONCRETE ENCASED DUCT.
4. TYPICAL. SEE 3-WAY DETAILS 7/ES-503 AND 2/ES-504.
5. VERIFY AND COORDINATE WITH DOIM FOR POST INTERCONNECTING AT EXISTING MANHOLE M1. REMAINING MANHOLES INDICATED ARE NEW.
6. STUB FUTURE COMMUNICATIONS DUCT BANK EXTENSION PER DETAILS 6/ES-503 AND 1/ES-504.

CABLING SCHEDULE:

MANHOLE	COPPER PAIRS	F.O. STRANDS
M1 - M10	500	84
M10 - M11	50	12
M10 - M12	150	36
M12 - M13	100	24
M10 - M14	250	24
M14 - M15	200	12
M13 - M16	50	12



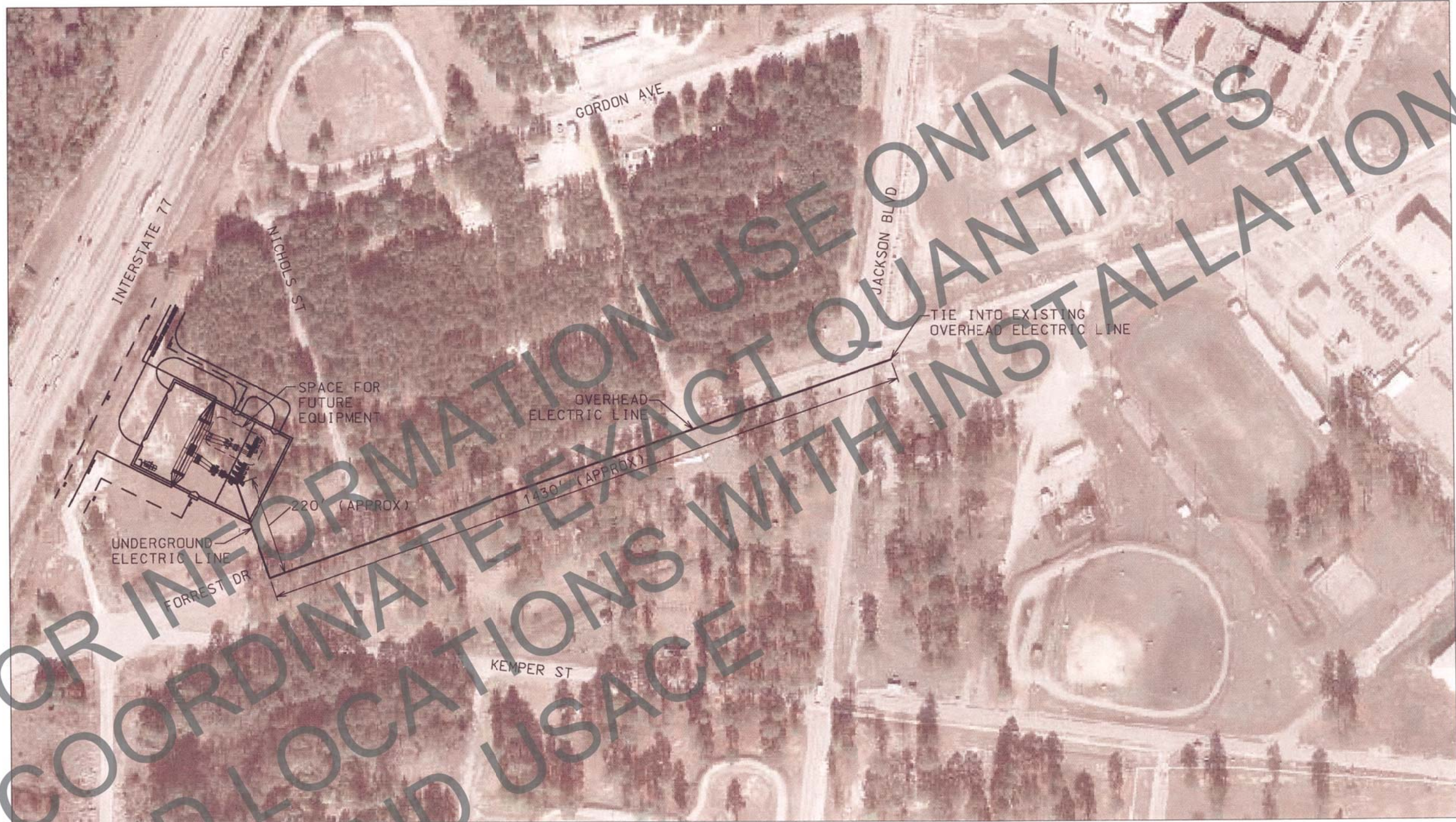
Revisions	Symbol	Description	Date	Appr.

Designed by: BROWNING	Date: 29 MAY 2009
Drawn by: MULKEY	Scale: 1"=200'-0"
Checked by: COLMAN, C. J.	Drawing code: 1/ES-504
Project Engineer/Architect:	Date:

SITE COMMUNICATIONS

BASIC TRAINING COMPLEX II
B/COF
FT. JACKSON, SOUTH CAROLINA
W9126G-09-D-007

File Name:
Sheet Number:
ES-103
Sheet 427 Of



CONCEPTUAL SUBSTATION
LOCATION PLAN



DRAFT - Subject to Revision

03 November 2009, 11:22 AM CST

Section:

APPENDIX GG

DEMARCATIION MATRIX

DEMARCATIION MATRIX

Item of Demarcation	Barracks Contractor [†] Scope/Limit of Work	Battalion Headquarter (BNHQ) Building Package Scope/Limit of Work
Site Grading ^{a, b}	<p>Provide rough and final site grading for the entire site per the contract documents. Positive drainage shall be provided within the building pads to prevent ponding or standing water.</p> <p>Provide rough graded building pads to the BNHQ Contractor and provide finished grade elevations to within 6" of the proposed finished floors of the BNHQ facility.</p> <p>Provide foundations, floor slab systems (ground or structurally-supported), and select backfill (non-expansive) required per geotechnical recommendations (by Barracks Contractor's Geotechnical Consultant) for the barracks buildings.</p> <p>Barracks Contractor is responsible for ensuring proper compaction under building per the recommendations provided by his Geotechnical consultant.</p>	<p>Provide foundations, floor slab systems (ground or structurally-supported), and select backfill (non-expansive) required per geotechnical recommendations.</p> <p>BNHQ Contractor will be responsible for ensuring proper compaction under building per the recommendations provided by his Geotechnical consultant</p>
Access Roads ^c	Barracks Contractor shall construct per RFP documents.	NA
Air Permit Initiation	<p>Barracks Contractor is responsible for initiating the request/exemption for Title V Air permit to the State of South Carolina</p> <p>Construct facilities per Title V permit</p>	NA

Item of Demarcation	Barracks Contractor ^t Scope/Limit of Work	Battalion Headquarter (BNHQ) Building Package Scope/Limit of Work
	approvals.	
Permits ^e	Barracks Contractor will obtain: <ul style="list-style-type: none"> • Overall SWPPP • Wetland Permits • Sanitary Tie-in • Water Tie-in 	BNHQ Contractor will obtain any building specific permits for the building. BNHQ Contractor will be secondary permittee for SWPPP
Storm Water Collection/ Detention ^f	Barracks Contractor shall provide initial storm water collection/detention as per the contract documents and shall provide final storm water collection/detention for overall site in accordance with specifications and all federal, state and local regulations; and will reroute existing drainage impacted by construction.	BNHQ Contractor to accommodate roof drains to below grade storm water collection system(s).
Natural Gas ^k	Barracks Contractor shall provide natural gas system as per contract documents and shall coordinate with the DPW for service and provide gas line from connection point to the barracks buildings and to the BNHQ facility 5 foot line. Barracks Contractor shall provide a pressure reducing station and the gas meter for the barracks and BNHQ/	BNHQ Contractor is responsible for gas service from the [5'] line to the building. BNHQ Contractor shall coordinate termination points with the Barracks Contractor.
Domestic Water Distribution ^g	Barracks Contractor is responsible for constructing the water distribution system for the Complex in accordance with PSUS Standards.	BNHQ Contractor is responsible for water service from the [5'] line to the building. BNHQ Contractor shall coordinate

Item of Demarcation	Barracks Contractor ^t Scope/Limit of Work	Battalion Headquarter (BNHQ) Building Package Scope/Limit of Work
	<p>Barracks Contractor is responsible for water service line to the barracks buildings.</p> <p>Barracks Contractor will also provide domestic water to the BNHQ 5' building line and temporarily cap.</p> <p>Water meters and back flow preventors for all buildings within the Complex will be provided by the Barracks Contractor and set in a DPW approved above ground environmental enclosure.</p>	<p>termination points with the Barracks Contractor.</p>
Fire Water Distribution ^h	<p>Barracks Contractor will provide the FDC, PIV and back flow preventor in DPW approved environmental enclosure for all buildings in the Complex and will also route the fire water line to the 5' building line of the BNHQ and temporarily cap.</p> <p>Barracks Contractor is responsible for fire water from the 5' line to the barracks buildings and any required elements required to construct his fire protection system. The Barracks Contractor is also responsible for the Barracks alarm system back to the Fire Department.</p>	<p>BNHQ Contractor is responsible for fire water line from the 5' line to the building and for any required elements to construct his fire protection system. The BNHQ Contractor will also be responsible for the alarm system back to the Fire Department.</p>
Sanitary Sewer ^j	<p>Barracks Contractor is responsible for constructing the sewer distribution system for the Complex in accordance with PSUS Standards.</p>	<p>BNHQ Contractor is responsible for sanitary sewer from the 5' line to the building and for any elements required inside the 5' line.</p>

Item of Demarcation	Barracks Contractor ¹ Scope/Limit of Work	Battalion Headquarter (BNHQ) Building Package Scope/Limit of Work
	<p>Barracks Contractor is responsible for sewer service from the 5' line to the barracks buildings.</p> <p>Barracks Contractor will provide sanitary sewer to the 5' building line of the BNHQ and temporarily cap.</p> <p>Barracks Contractor will provide all sanitary sewer elements required outside the 5' line including a dual cleanout.</p>	
Primary Electrical Service ¹	<p>Barracks Contractor shall provide primary electric service as per contract documents and is responsible for electrical distribution within the Complex's construction boundaries.</p> <p>Barracks Contractor shall provide primary electric service from connection to the barracks buildings. The Barracks Contractor shall provide the transformers and equipment pads for the barracks buildings.</p> <p>Barracks Contractor shall provide the primary electric to the 33' line of the BNHQ.</p>	<p>BNHQ Contractor will provide:</p> <ul style="list-style-type: none"> • secondary conductors • secondary conduit • grounding at transformer • transformer and pad • transformer metering
Communications Duct Bank	<p>Barracks Contractor will provide communication service as per contract documents and shall provide the duct bank from the connection point to the barracks and to the 5' line of the BNHQ and temporarily cap.</p>	<p>BNHQ Contractor will provide duct bank from the 5' line into the communications room.</p>

Item of Demarcation	Barracks Contractor ^t Scope/Limit of Work	Battalion Headquarter (BNHQ) Building Package Scope/Limit of Work
	The Barracks Contractor shall provide duct bank from the 5' line into the barracks communications rooms.	
Phone Cabling – Copper ^m	<p>Barracks Contractor shall provide phone/copper from the communication tie in point at the telecommunication building at the intersection of Dixie Rd and Golden Arrow Rd to a manhole near the 5' line of barracks and BNHQ facilities. Barracks contractor shall provide splicing for B/COF and BNHQ facilities in primary manhole near BNHQ.</p> <p>Building Contractor shall provide phone/copper lines from the communications manhole near the barracks buildings and any copper/phone elements required within the barracks. Provide service entrance termination hardware.</p>	BNHQ Contractor will provide a 4-4"C duct bank from the 5' line into the communications room. BNHQ Contractor will extend 200 pair voice grade copper into BNHQ telecommunications room and terminate.
Data Cabling – Fiber ⁿ	<p>Barracks Contractor shall provide cabling/fiber from the communication tie in point manhole to the manhole near each facility and terminate on the service entrance termination.</p> <p>Barracks Contractor shall provide any data cabling/fiber from the manhole and elements required within the facility. Provide service entrance termination hardware.</p>	BNHQ Contractor will extend 24 strand singlemode fiber and three sets of 12 strand singlemode fiber from primary communications manhole into BNHQ and provide any data cabling/fiber elements required within the facility. Provide service entrance termination hardware.

Item of Demarcation	Barracks Contractor ^t Scope/Limit of Work	Battalion Headquarter (BNHQ) Building Package Scope/Limit of Work
Cable Television	CATV is privatized and will be provided by Time Warner. Design and service to the Complex's buildings will be provided by Time Warner after contract completion. The Barracks Contractor shall provide an empty 4" conduit with pull wire from the main telecommunications room to a handhole located 5' outside the building wall. Time Warner will provide the cable to the point of demarcation in the main Telecommunications Room.	CATV is privatized and will be provided by Time Warner. Design and service to the Complex's buildings will be provided by Time Warner after contract completion. The Building Contractor shall provide an empty 4" conduit with pull wire from the main telecommunications room to a handhole located 5' outside the building wall. Time Warner will provide the cable to the point of demarcation in the main Telecommunications Room.
UMCS / EMCS	Barracks Contractor will provide any cabling/fiber elements, integrating new system information and new software required to connect and integrate new building EMCS for all equipment and systems into the existing UMCS.	BNHQ Contractor will provide any cabling/fiber elements, integrating new system information and new software required to connect and integrate new building EMCS for all equipment and systems into the existing UMCS.
Building Identification	Barracks Contractor shall provide Barracks Complex signage for the entire complex, including freestanding signs to the BNHQ buildings.	Building number signage is to be provided and installed by the BNHQ Contractor.
Sidewalks ^o	Barracks Contractor shall provide all Complex's sidewalks, including to the 5' line of the BNHQ and connect to existing sidewalks and POV parking areas.	BNHQ Contractor is responsible for building stoops and handicap ramps at buildings and for tying into the sidewalks constructed by the Barracks Contractor.

Item of Demarcation	Barracks Contractor ^t Scope/Limit of Work	Battalion Headquarter (BNHQ) Building Package Scope/Limit of Work
Parking Lots	Barracks Contractor shall construct per RFP documents.	NA
Landscaping ^o	Barracks Contractor shall provide all landscaping within the Complex.	NA
Trash/Recycling Dumpster Pad ^o	Barracks Contractor shall construct per RFP documents.	NA
Site AT/FP Elements ^p	Barracks Contractor shall provide any site AT/FP elements and ensure minimum setback distances are established and maintained.	BNHQ Contractor is responsible for any required AT/FP elements within the 5' line.
Equipment Pads (Condensers, Chillers, etc) ^q (if required)	Barracks Contractor shall provide landscaping to screen equipment and shall provide equipment pads to all facilities within the Complex. Pads shall be located IAW AT/FP criteria.	NA
HVAC Distribution Piping (if required)	Provide as per contract documents. Provide HVAC distribution piping from the valve pit to the barracks buildings and to the 5' line of the BNHQ.	BNHQ Contractor to provide piping size requirements to the Barracks Contractor.
Oil/Water Separator, grease interceptors ^{r, s}	NA	NA
Fencing and gates ^o	Barracks Contractor to provide fencing and gates, as required.	NA
Sustainability, LEED	Responsible for registration of project with USGBC and documentation of	Responsible for building related portion of combined bldg/site LEED

Item of Demarcation	Barracks Contractor¹ Scope/Limit of Work	Battalion Headquarter (BNHQ) Building Package Scope/Limit of Work
building/site interface	points attained for LEED. Responsible for site related portion of combined bldg/site LEED Credits, as well as, for the building portion for the barracks facilities.	Credits.
Site/Security Lighting	Barracks Contractor to provide all general area, parking, security, and pedestrian lighting outside the 5' lines of all buildings within the Complex. The Barracks Contractor shall coordinate location and size of services with the BNHQ Contractor.	BNHQ Contractor shall provide adequate capacity in electrical service to supply outside lighting requirement. These include designated spare circuit breakers and branch circuits extended to the 5' line as coordinated with Barracks Contractor. Provide spare conduit and pull wires in all conduits.

NOTES:

The demarcation limits for each utility/item of work listed may be modified to satisfy constraints associated with the site and facility type.

- a. TOPOGRAPHIC SURVEY - See paragraph 6.4.1. No new topographic survey was completed for this RFP. The topography shown is as provided by the Installation. The contractor shall obtain additional survey required for design completion at no additional cost to the Government.
- b. SITE GRADING - Final building pad elevation(s) shall be graded to within 6 inches below the established finish floor elevation for building. Ensure that finish floor elevations are above the 100-yr flood elevation. Ensure that all accessible routes are in compliance with the Uniform Federal Accessibility Standards (UFAS). Coordination shall be required with adjacent contracts.
- c. ROADS AND PAVEMENTS – As shown on drawings.
- d. ORGANIZATIONAL PARKING – As shown on drawings.
- e. PERMITS - Determine permit requirements including, but not limited to, digging permits, special disposal requirements for any hazardous materials, E&S control, etc. Since there are multiple contracts, it is crucial to determine responsible parties.

- f. **STORMWATER MGMT** - Barracks Contractor shall route runoff to prevent ponding or standing water. Stormwater management shall be as required by the state. Determine NPDES permit requirements. A Storm Water Pollution Prevention Plan (SWPPP), including an E&S Control Plan, will be required for the project even if there are multiple projects and an overall SWPPP is obtained.
- g. **DOMESTIC WATER DISTRIBUTION** - Determine PSUS requirements, including details, specifications, meter requirements, backflow prevention, fees, etc. Contractor will install new lines or subcontract the work to PSUS or a qualified Mechanical Contractor. Remotely read water meters are to be installed. Water Meters should include pulse counters and be capable of communicating via MODBUS TCP/IP. Contractor is responsible for installing an 802.11 a-g FIPS 140-2 compliant radio to connect to the Government meter and EMCS network. Coordinate radio information with DPW.
- h. **FIRE WATER DISTRIBUTION** - Install fire lines as shown on the drawings and per PSUS specifications and standards. Coordinate with the Fire Dept to determine if there are any special requirements for the installation/facility. Ensure that the design is in compliance with the applicable UFC documents, including, but not limited to, fire truck access, fire hydrant locations, etc.
- i. **FIRE ALARM** - Coordinate requirements with the installation Fire Department and others, as applicable. Fire alarm shall be designed in accordance with the following criteria:

1. Project will be designed IAW UFC 3-600-1 dated 26 Sept 2006.
2. Provide an addressable fire alarm control panel (FACP).
3. Provide Monaco BTX w/ narrowband technology for FACP.
4. All devices will be labeled by FACP address.
5. Add pull station covers to all pull stations to reduce accidental alarms.
6. All conduit will be painted with a red stripe every 10 feet.
7. FACP panel and Monaco BTX will be mounted side by side at eye level.
8. Provide training to fire department personnel and fire alarm maintenance on FACP.
9. Use duct detectors that are self resetting and for use in high humidity, with remote test indicator at each detector.
10. No requirement for FACP annunciator panels by entry doors.
11. Fire Prevention Office will determine location of FACP.
12. FACP will not be located below grade on new construction or renovations.
13. RFP should specify maintenance accessibility for initiating devices to include duct detectors.
14. All automatic sprinkler system valves will be electronically supervised by the FACP to include the PIV.
15. Automatic sprinkler systems will provide coverage throughout 100% of the building except as permitted by NFPA 13.
16. Provide FDC signage IAW NFPA 13.
17. Provide lockable circuit breakers for the FACP.
18. Include a dry standpipe in all facilities >3 stories or as determined by Fire Prevention Office. Wet standpipe preferred but a dry standpipe is acceptable.
19. Fire department access for roads/gates shall have an unobstructed width of not less than 20 ft. and 13 ft. 6 in. for vertical clearance IAW NFPA 1.
20. Provide Knox Box system for all new and renovation construction. Fire Prevention has information needed for Knox Box keying. Order part # 3227 with hinged door and alarm tamper switch (Brown in color).
21. If new fire hydrants are installed, hydrants are to be painted as follows: all barrels are to be painted chrome yellow. The tops are to be painted with the coordinated capacity indicating color scheme as per NFPA 291 Chapter 5.
22. Fire flow data can be obtained from Palmetto State Utilities Services.

- j. **SANITARY SEWER** - Where applicable, determine PSUS requirements, including details, specifications, etc. Install new lines and associated piping, as shown on the drawings, and pay required fees. If pump stations are required, coordinate with electrical to ensure that secondary power is provided, if required.
- k. **NATURAL GAS** - Install new lines and associated piping, as shown on the drawings, and pay required fees. Conform to PSUS requirements, including details, specifications, meter requirements, pressure reducers, etc. Gas Meters should include pulse counters and be capable of communicating via MODBUS TCP/IP. Contractor is responsible for installing an 802.11 a-g FIPS 140-2 compliant radio to connect to the Government meter and EMCS network. Coordinate radio information with DPW.
- l. **PRIMARY ELECTRICAL SERVICE** - Where applicable, determine utility requirements, including details, specifications, meter requirements, etc. Install new lines, as shown on drawings, pay fees, etc. Determine if the existing system has sufficient capacity, etc.
- m. **COMM'S - TELEPHONE CABLING** - Determine installation utility requirements, including details, specifications, etc.
- n. **COMM'S - DATA CABLING** - Determine installation utility requirements, including details, specifications, etc.
- o. **SITE FEATURES** - Coordinate with installation, etc., as required. Plantings to conform to FJ Planting List.
- p. **SITE AT/FP ELEMENTS** - At a minimum, designs must comply with UFC 4-010-01. If there are multiple contracts, coordination shall be required to determine responsible parties. Conform to all items shown on AT Construction Standards Checklist.
- q. **EQUIPMENT PADS (TRANSFORMERS, CONDENSERS, CHILLERS, ETC.)** - Coordinate with installation, etc., as required. Ensure that equipment locations consider AT/FP requirements as per UFC 4-010-01.
- r. **GREASE INTERCEPTOR** - Coordinate with the installation to determine applicable code requirements to be considered during design. Coordinate with PSUS to determine their requirements.
- s. **OIL/WATER SEPARATOR** - Coordinate with the installation to determine applicable code requirements to be considered during design. Coordinate with PSUS to determine their requirements.
- t. **Off-Site Utilities and Barracks Contractor** - The Barracks D/B Contractor is responsible for the construction of the Barracks facilities, as well as, for the Barracks work within the Complex's construction boundary as detailed in this Demarcation Matrix and Section 01 10 00 of the RFP contract document.

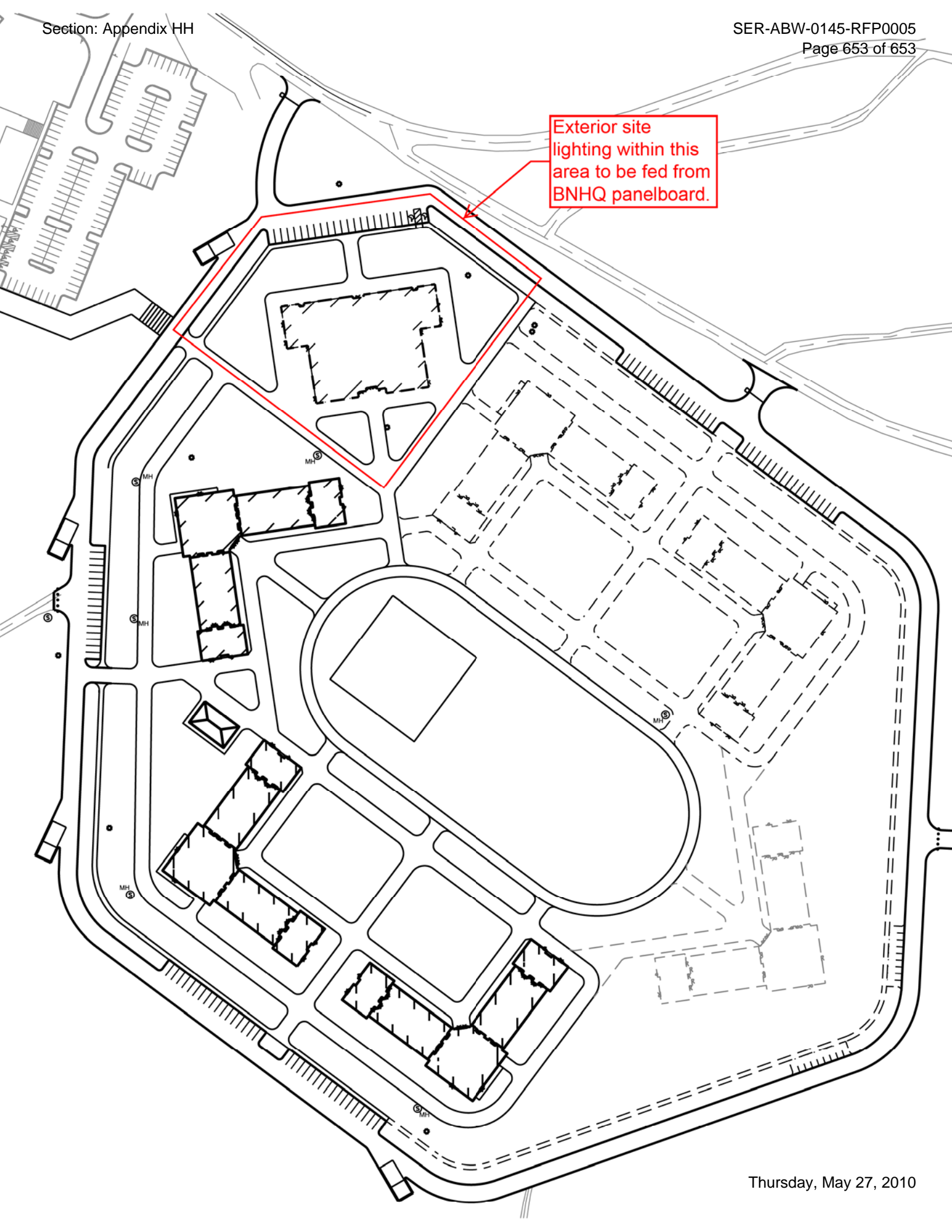
- u. Arms Vault Intrusion Detection System IDS: The IDS system used is the Integrated Commercial Intrusion Detection System III (ICIDS III). The IDS will be installed by DRS Defense Solutions, Inc. The Barracks Contractor shall provide dedicated power using a 2-pole breaker position within an electrical panel with a 30 AMP 120VAC breaker and dedicated Communications using one dedicated phone line utilizing Bell 202 standard in separate junction box near the RADC location. The IDS shall be tied in to the Emergency Dispatch Center located at Building 5499, Directorate of Emergency Services. See paragraph 3.7.6 for additional IDS requirements. For further information, contact Mr. David Little, Directorate of Emergency Services, Physical Security at (803) 751-7076.
- v. Intrusion Detection System (IDS): An Intrusion Detection System shall be provided for each arms vault. Provide a Control Panel, Balanced Magnetic Switch, Motion Sensor and Duress switch unless specified otherwise. System requirements for number of sensors will be coordinated with the installation.
- w. Door hardware is to conform to FJ standards and keying system.

APPENDIX HH

BNHQ AREA

EXTERIOR SITE

LIGHTING CIRCUITS



Exterior site
lighting within this
area to be fed from
BNHQ panelboard.